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THE SHRIMP FISHERY OF THE SOUTHERN UNITED STATES

By W. W. Anderson,* M. J. Lindner, ** and J. E. King**

INTRODUCTION

The Shrimp Investigations^{1/} were established in 1931 by the U. S. Bureau of Fisheries in response to requests from the industry and the State conservation agencies, who had expressed concern over the possibility of depletion of the shrimp supply. The work has covered the range of the commercial shrimp fishery in eight maritime Southern States from North Carolina to Texas. Many of the studies and activities have been carried on in cooperation with the Louisiana Department of Wildlife Fisheries; the Texas Game, Fish, and Oyster Commission; and the Georgia Department of Game and Fish.

The shrimp fisheries of the United States and Alaska produced in 1945 (the last year for which complete figures are available) a total of 191,345,000 pounds valued at \$21,369,000 to the fishermen compared with 1940 when 152,663,000 pounds were produced, valued at \$5,954,000. Of the 1945 total, the South Atlantic and Gulf States fishery produced 189,024,000 pounds valued at \$21,289,000 to the fishermen. During 1945, shrimp ranked fifth in volume and fourth in value of all the fisheries of the United States and Alaska, being exceeded in volume only by pilchard, menhaden, salmon, and sea herring, and in value by salmon, oysters, and tuna.

Shrimp is by far the most valuable fishery resource of the South Atlantic and Gulf States, being exceeded in volume only by the menhaden, which it exceeds several times in value. In view of the rapid growth of the industry and its major importance to the South, a careful and comprehensive study of the resource was indicated for the purpose of securing information which would assist the various conservation agencies in managing the resource so as to obtain a maximum sustained yield.

To date, the Investigations have contributed several publications.^{2/}

This report gives a brief history of the gear, geographical distribution of the fishery, fishing seasons in the various sections, relative importance of the various shrimp species, and catch statistics from 1880 to the present.

THE DEVELOPMENT OF THE FISHERY

The Introduction of the Otter Trawl

Until the otter or shrimp trawl was introduced some time between 1912 and 1915, the most efficient gear for catching shrimp was the haul seine. At about that time, the Bureau of Fisheries, at its station in Beaufort, North Carolina, had

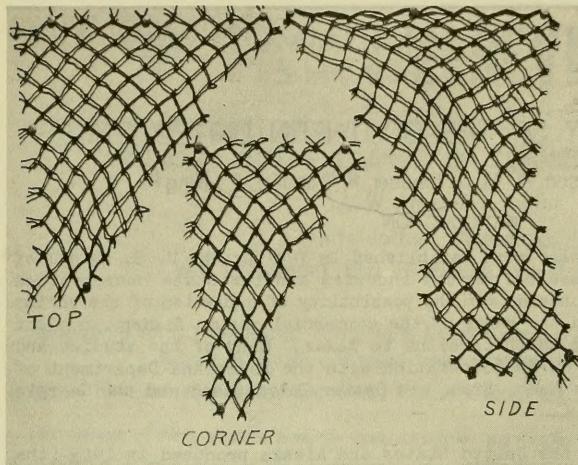
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^{1/}Now Gulf Investigations.

^{2/}Weymouth, Lindner, and Anderson, 1933; Johnson and Lindner, 1934; Lindner, 1936; Pearson, 1939; Anderson and Lindner, 1943; and King, 1948.

been using a small otter trawl for collecting marine forms. Fishermen, noting that shrimp were being taken by these nets, adopted the idea, and larger trawls were constructed for use in the commercial shrimp fishery. Apparently, the first shrimp trawling took place at Fernandina, Florida. Use of the trawl spread rapidly throughout the South Atlantic and Gulf regions and, by 1917, had become the standard commercial gear.

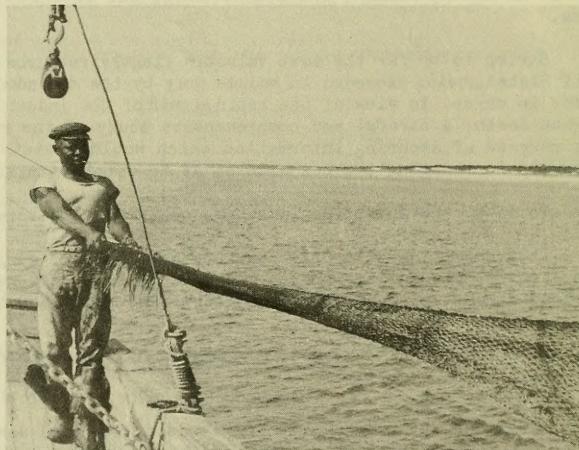


TAPER CUTS USED IN MAKING SHRIMP OTTER TRAWL

With the development and widespread use of the shrimp trawl, the haul seine gradually disappeared. Louisiana was the last locality in which it was employed. During the early 1930's, a few seines were still being used; but these dropped out one by one, until at present, there

appears to be none in operation; and the trawl remains the exclusive gear for commercial operations.

Introduction of the trawl completely revolutionized the shrimp industry. Whereas, the haul seine could be used only in shallow waters, required a large crew of men, and could be operated for only a limited time during the summer and fall months, the shrimp trawl was adaptable for use over a much greater range, could be operated with fewer men, yielded a greater production per man, and was a much more efficient type of gear. Its introduction opened up entirely new grounds, and led to a rapid expansion of the fishery.



TAIL OR BAG OF SHRIMP TRY NET USED BY SHRIMP TRAWLERS

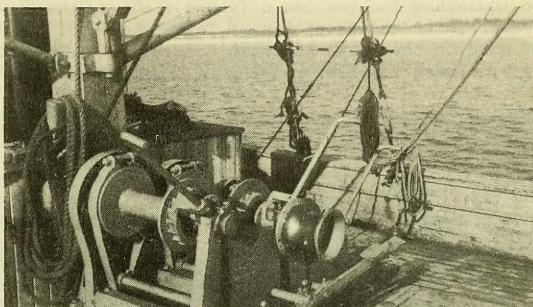
Trawls now in use vary in size from the 10-foot try net, used for locating schools of shrimp, to the vessel's main trawl which may have a spread of 120 feet at the mouth. Its dimensions depend largely on the size and power of the vessel.

Vessels

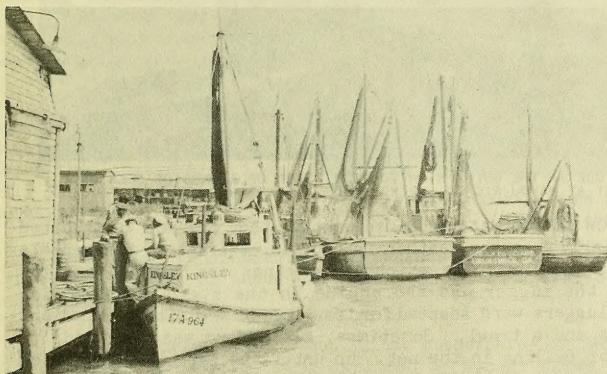
SOUTH ATLANTIC: Improvement of the vessels employed in the fishery was rapid after introduction of the shrimp trawl. More seaworthy hulls, larger engines, and better deck equipment were necessary as the operations went farther afield and larger trawls were placed into use. By the middle 1920's, practically all shrimp boats on the South Atlantic Coast were equipped with some type of power winch for hauling the trawls. These winches were operated either from a separate deck engine or a power take-off from the main engine, and used in conjunction with a mast and boom or mast and "A" frame with rope towlines. The separate deck engine and "A" frame were gradually replaced by the winch powered from the main engine and used in connection with a boom, until at present, few if any, deck engines and "A" frames remain in operation. On the larger vessels, rope towlines

and "A" frames were replaced by steel cables operating from an outrigger attached to the mast and running to a drum hoist powered from the main engine.

The fleet has evolved into two general types of craft. The first group consists of small boats approximately 30 to 45 feet in length, restricted primarily to local use. Generally, they are powered with gasoline or distillate burning



TYPICAL OTTER TRAWL WINCH USED IN SOUTHERN SHRIMP FISHERY



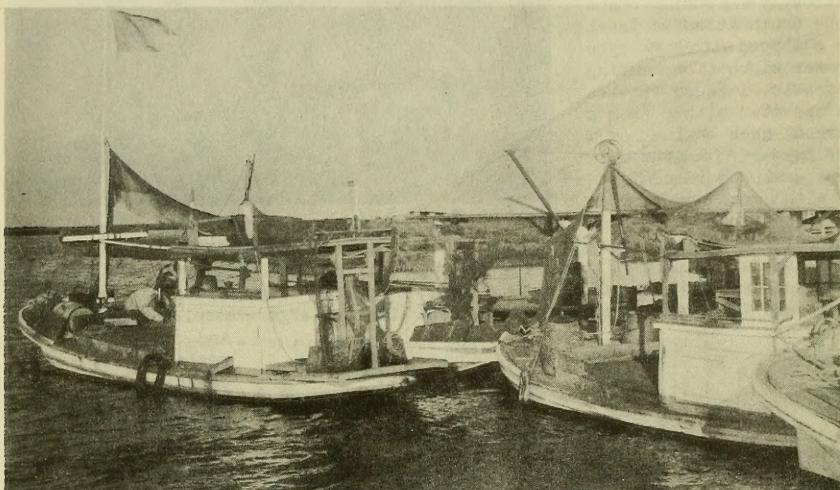
SHRIMP TRAWLERS IN PORT OF BRUNSWICK, GEORGIA

engines, although there has been a recent tendency to use more diesel engines. These vessels usually are equipped with power winch and rope towlines. The second group is composed of vessels approximately 50 to 65 feet in length, practically all diesel powered and employing the steel cable and drum hoist rig. The latter vessels are naturally the more seaworthy and fish almost entirely in the outside waters. Since the design of this vessel was developed primarily in Florida, it has become widely known over both the South Atlantic and Gulf Coasts as the Florida-type trawler.

In general, the group of smaller vessels presents a varied array of designs, since local tendencies and individual ideas enter into their construction. The

Florida-type vessels, on the other hand, are all constructed along the same general lines.

GULF OF MEXICO: Until about 1938, when Florida-type trawlers were introduced into Louisiana for the new offshore fishery, the type of vessel in general use in the Gulf (with the exception of Texas where the boats were similar to the smaller ones used on the South Atlantic Coast) was fairly standard and was known as the lugger. These vessels, ranging in length from 25 to 50 feet, are of shallow draft



SHRIMP LUGGERS (IN GENERAL USE IN THE GULF PRIOR TO 1938) TIED UP ALONGSIDE DOCK OF SHRIMP PLANT AT BAYOU RIGAUD, GRANDE ISLE, LOUISIANA

and designed for the shallow inside waters. Consequently, they are not well suited for the open Gulf, particularly when the weather is bad. In contrast to the vessels of the South Atlantic Coast and Texas, in which the engines are forward and the fish hold is in the stern, the lugger has the engine in the stern and the fish hold forward. These early luggers were adapted for trawling by the simple expedient of adding a set of towlines and a trawl. Sometimes, a platform was extended off the stern to provide room for pulling in the net. Up until the late 1930's, few of these vessels carried power-driven machinery for putting out or taking in the trawls. At present, many of the better equipped and more recently built luggers employ a hoist, but on a number of the older boats, the gear is still operated entirely by hand.

As on the South Atlantic Coast, the shrimp fleet on the Gulf of Mexico can be classified into two types, the inshore and the offshore. The inshore vessels consist chiefly of the lugger type ranging in length from 25 to 55 feet and include the small Texas boats. They are usually powered with gasoline motors, but in recent years, more and more diesel engines have been installed on the larger vessels. They fish mainly the inside waters and Gulf waters close inshore. Peculiar to the Louisiana, Mississippi, and Alabama fishery is the use of ice or freight boats in conjunction with the small luggers. These ice boats are large luggers used for picking up shrimp on the fishing grounds, icing, and transporting them

to the cannery or other unloading station. The small vessels, as a rule, do not carry ice, but when they catch shrimp, they pull alongside an ice boat and unload. The ice boat collects shrimp until it gets a capacity load; then it proceeds to port, unloads, takes on more ice, and returns again to the fishing grounds. When a fleet of luggers is operating some distance from port, the ice boat will also supply the fleet with fuel, water, and provisions. Along the South Atlantic Coast and in Texas, each vessel carries its own ice and lands its catch individually. There are advantages to the ice boat system in the localities where it is employed. Quite often the luggers operate at considerable distances from the port where their shrimp are to be landed, and for each vessel to secure ice and bring in its catch would force it to spend much of its time in traveling to and from the fishing grounds.

The offshore trawlers operate chiefly in the open Gulf of Mexico. These vessels are of the Florida design and range from 50 to 65 feet in length, with a few from 75 to 85 feet.

This type of vessel, because of its seaworthiness, was introduced into Louisiana from Florida about 1938 to engage in the offshore fishery. From Louisiana, its use spread rapidly over the fishery from Alabama to Texas. Typically, it is diesel powered and uses cable rigs with drum hoists powered from the main engine. It is capable of a wide range of activity, and commonly makes trips of 10 days' duration, which is about the limit of time ice will last or the catch can be safely held.



TYPICAL OFFSHORE TRAWLERS TIED TO THE DOCK AT MORGAN CITY, LOUISIANA

Since 1944, considerable interest has developed in 55- to 65-foot all-steel trawlers. Several of these have been placed in operation, and others are being constructed.

The most recent development is the mothership- or factory ship-type of operation, which is presently being explored by two or three enterprising companies. The motherships are vessels of 100 to 150 feet in length, equipped with the necessary machinery and crew for heading and freezing the catch. The large vessel may do some trawling on her own, but depends to a great extent on the catch of small feeder boats. As in other fisheries in other parts of the country, it is still to be determined whether or not such an operation can be carried out successfully.

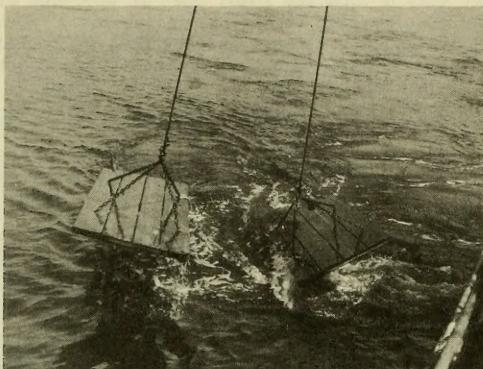
Methods of Fishing

While the shrimp trawl gear is operated essentially the same by the inshore and offshore fleets, there are differences between the fleets in methods of locating shrimp.

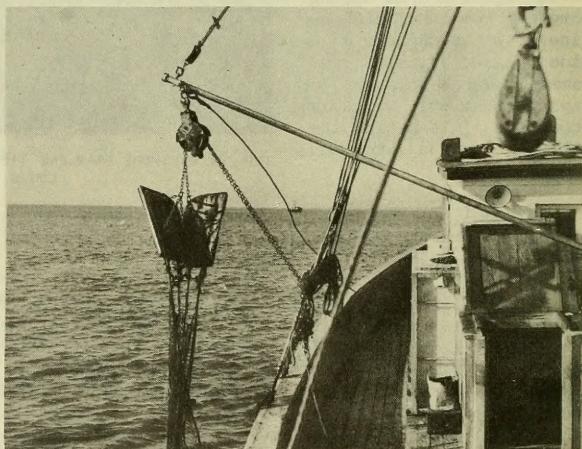
INSHORE VESSELS: Use of the try net for locating shrimp is not as widespread among inshore vessels as among offshore vessels. Three general types of fishing methods appear to be prevalent.

In the first, the fisherman uses no means of locating shrimp other than the main trawl. He goes to the fishing grounds where he thinks shrimp may be found. The main trawl is put out and dragged for a time and taken up. The length of drag is a matter of choice of the fisherman, but generally, the trawl is fished for one-half hour to two hours for each haul. If the catch is sufficient, the trawl is again put over; otherwise, a new area is sought and the procedure repeated. The second method, still being employed in shallow water areas, involves the use of a cast net thrown ahead of the boat as it moves slowly over the flats. When shrimp are

taken in the cast net, the trawl is put out. As the trawling proceeds, the cast net is continually thrown ahead of the boat. If the boat passes into an area where shrimp can no longer be taken in the cast net, the boat is swung around to cover again the area where shrimp were found. This second method is employed in Louisiana but does not appear to be used elsewhere in the fishery. The third, and most efficient method, involves the use of a try net for locating shrimp before the large trawl is put into operation. A small trawl, usually about 10 feet wide at the mouth, is hauled behind the boat and pulled in at frequent intervals. As soon as shrimp are taken in sufficient abundance to indicate a worthwhile area, the large trawl is put out. The try net continues in operation just ahead of the large trawl and is pulled in at frequent intervals. By this means, the fisherman can tell whether he is still trawling through a concentration of shrimp or has passed beyond. When he has passed the concentration, he changes course and resumes trawling through the area where the try net showed shrimp to be present.



SETTING OTTER BOARDS FROM A SHRIMP TRAWLER



PORTION OF TRY NET AND DOORS USED BY OFFSHORE SHRIMP TRAWLERS FOR LOCATING SHRIMP

In Mississippi, on occasions, fishermen have used as a try net a conical bag of webbing attached to a semi-circular metal frame about 3 feet across the base. A short 3-strand bridle is fastened to the frame for towing from a single rope. It is believed that this type of try net has now been completely displaced by the miniature trawl.

Another method of locating shrimp has been observed in the shallow inside waters around Beaufort, North Carolina, and not elsewhere in the fishery. A long oar is put out from the side while the boat is running at slow speed close to shore. When shrimp are present, they can be readily seen as the moving oar disturbs them causing the shrimp to jump out of the water as the oar passes.

Fishermen will always try a muddy patch of water whenever one is found as frequently, concentrations of shrimp, presumably while feeding, will stir up quantities of mud. This is not infallible, as schools of fishes also cause muddy patches.

OFFSHORE VESSELS: All offshore craft employ a try net for locating shrimp. It operates from an outrigger with a steel cable running to a drum hoist. Since the offshore fishing grounds are rather extensive, a vessel may spend considerable time searching before shrimp are found.

The large trawls are put out when the try net hauls show indications of a concentration of shrimp. As trawling proceeds, the try net, similar to the procedure used by the inshore boats, is hauled ahead of the large net and pulled in at frequent intervals to enable the vessel to stay with the concentration of shrimp. If a good catch is made on a location, or the try net shows shrimp present in quantity, a buoy may be put out to mark the area.



A MIXED CATCH OF FISH AND SHRIMP JUST AS IT HAS BEEN DUMPED ON THE DECK OF AN OFFSHORE SHRIMP TRAWLER

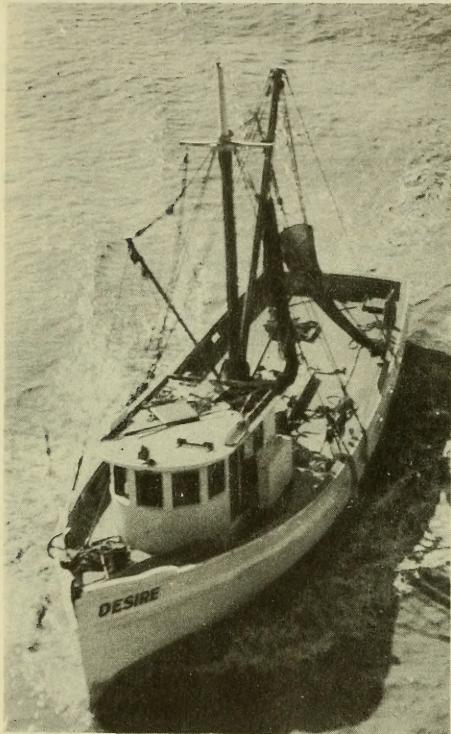
Shore Establishments

SOUTH ATLANTIC STATES: In the South Atlantic States, shrimp are landed at two principal types of shore plants: canneries and raw-shrimp houses. The main cannery centers are at Thunderbolt, Darien, and St. Marys, Georgia; and Fernandina, Florida; but in recent years, they have operated only intermittently. Canneries are necessarily the more elaborate and costly type of shore facility, since they must contain processing equipment not required in the raw-shrimp plants. In addition,

they must be located at points where production is large and fairly stable, since they cannot change their locations from one area to another, like the raw-shrimp plants. In general, the canneries depend largely on the smaller-type vessels to supply their raw product, and the bulk of the pack is put up during the fall season.

The raw-shrimp plants, which handle the largest percentage of the production, are relatively simple establishments. In general, they consist of an unpartitioned building in which are located a small office, tables for heading shrimp, washing vats, a set of scales, ice crusher, and space for storing boxes and fishing gear.

Some of the more permanent ones, like many of the canneries, may have in conjunction, a small machine shop and other facilities for upkeep of the vessels. The raw-shrimp plant dealers operate most of the larger Florida-type boats.



A TYPICAL LOUISIANA OFFSHORE TRAWLER OF ABOUT 60 FT. OVER-ALL LENGTH AND 16 NET TONS

As the fishery expanded, many of the raw-shrimp dealers began operating at various locations up and down the coast following the run of shrimp. For example: an operator may work the fall run in South Carolina or Georgia, move to Florida for the winter fishery, and then return to South Carolina or Georgia for the spring season.

Principal landing ports from which raw-shrimp dealers operate are Atlantic, Beaufort, Morehead City, and Southport, in North Carolina; Charleston, Beaufort, and Georgetown in South Carolina; Thunderbolt, Darien, Brunswick, and St. Marys in Georgia; Fernandina, Mayport, St. Augustine, and New Smyrna in Florida.

GULF OF MEXICO: In the Gulf of Mexico, shrimp are landed principally at canneries and raw-shrimp plants; and in addition, in Louisiana, at drying platforms and stations where there are only docks, from which the shrimp are trucked to a plant or market.

The great majority of the shrimp canneries are located along the Gulf Coast, mainly in Louisiana and Mississippi. The principal cannery centers from East to West are: Bayou LaBatre, Alabama; Biloxi, Mississippi, New Orleans and vicinity, Houma and vicinity, and Golden Meadow, Louisiana.^{3/}

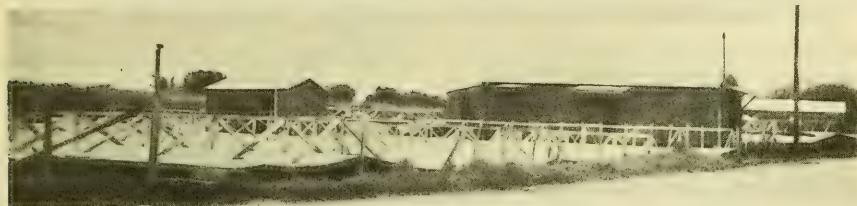
The canneries draw most of their production from the smaller type of vessels, but for the past several years, they have been receiving increasingly greater amounts.
^{3/} There are also two plants in Texas at Aransas Pass and Palacios, which operate intermittently.

from the larger craft. The canned pack is put up largely during the fall season. In recent years, the canneries, because of greater profit, have been diverting much of their raw product to the fresh and frozen shrimp markets.

In the Gulf of Mexico, the raw-shrimp plants tend to be a more permanent type of establishment, as the dealers do not move from one place to another. The larger concerns may have their own fuel tanks, machine shops, boat ways, etc., as do many of the canneries. Although the raw-shrimp dealers operate most of the offshore trawlers, many draw their production from inshore boats as well. Many new raw-shrimp companies have entered the fishery in the past several years.

Shrimp are landed at raw-shrimp houses in every shrimp fishing port along the Gulf Coast. The greatest concentration of these establishments is in the vicinity of Morgan City, Louisiana, the home port for the majority of the rapidly growing offshore fleet.

The sundrying of shrimp is limited to the State of Louisiana and is concentrated largely in the Barataria, Timbalier, and Terrebonne Bay areas. The drying platforms



A SMALL SHRIMP DRYING PLATFORM ON BAYOU GRAND CAILLOU BELOW HOUma, LOUISIANA

utilize small shrimp which are usually not desired by either the raw-shrimp houses or the canneries. At one time, a large volume of shrimp was utilized for this purpose, but sun drying appears to be declining.

Perhaps in response to the demands of the public, continually more shrimp are appearing on the market as an attractively packaged, frozen product. New freezers have been built and are being built throughout the range of the fishery. This assures the consumer of a more fresh and sanitary product than he received when the shrimp were shipped and handled in distant markets as "fresh-iced." Furthermore, the cold-storage facilities of the freezers permit the accumulation of the product during the height of the season and its release during times of low production.

GEOGRAPHICAL DISTRIBUTION, MAIN FISHING AREAS, AND SEASONS

For material giving an indication of the seasons in the various States, we have drawn on data from varied sources and periods. Data for recent years were used where available, but for Georgia and Florida only, data for earlier years could be used. Although not as uniform as might be desired, the material indicates quite clearly the main seasons in each of the States.

In Table 1, the average monthly production of shrimp in the various States is expressed as percentages of the average yearly total catch.

In general, all of the States have their maximum production from August or September to November or December. The shrimp taken then are largely young and immature, and had been spawned the preceding spring. A second and lesser season

Table I - Percentages of the Shrimp Catch by Months - South Atlantic and Gulf States

Month	N. C.	S. C.	Ga.	Fla.	Ala.	Miss.	La.	Tex.	Total
January	3.3	0.0	2.2	18.8	1.3	6.7	11.2	2.2	10.4
February	0.0	0.0	2.5	11.2	.8	4.2	7.2	1.6	6.5
March .....	.3	0.0	2.8	10.4	.6	2.6	4.0	1.1	4.2
April .....	.5	.1	3.6	8.2	.1	3.3	1.9	4.4	2.8
May	1.2	1.9	6.1	4.7	.7	5.5	3.3	10.3	4.2
June .....	.7	2.9	8.0	6.2	3.8	2.7	7.6	10.2	7.5
July	7.9	9.5	5.5	2.5	2.0	1.4	6.4	5.5	5.9
August	19.2	16.8	16.8	5.8	24.0	8.0	2.7	3.3	4.1
September	19.9	24.9	19.7	5.9	20.5	12.4	12.0	19.2	12.8
October	29.5	28.5	17.2	5.0	17.4	21.0	13.3	21.5	14.0
November	15.8	14.1	12.2	6.7	20.0	21.1	15.8	13.6	14.5
December	1.7	1.3	3.4	14.6	8.8	11.1	14.6	7.1	13.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Data for N. C., S. C., Ga., La., and Tex. are from the various State Conservation Agencies; for Fla., from records of the U. S. Fish and Wildlife Service Statistical Agent; and for Ala. and Miss., from the U. S. Fish and Wildlife Service Market News reports.

For N. C., Ala., Miss., La., and Tex. the percentages are derived from a 5-year average covering the years 1941 to 1945; S. C. a 4-year average from 1941 to 1944; Ga. a 5-year average from 1931 to 1935; and Fla. a 2-year average from 1933 to 1934.

of importance extends from April or May to June or July. The shrimp taken then are mainly large and mature or maturing.

South Atlantic States

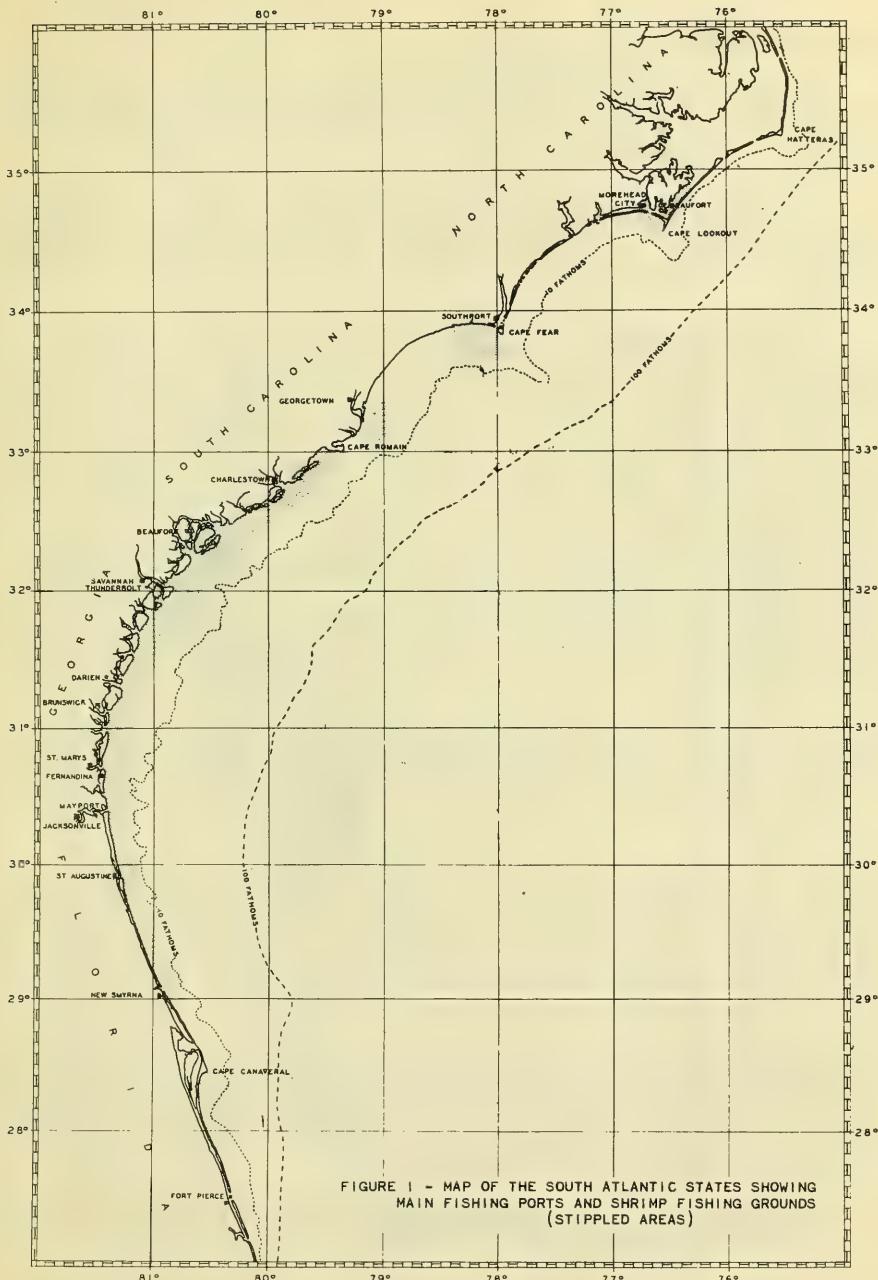
The shrimp fishery of the South Atlantic States (Figure 1) extends approximately from Beaufort, North Carolina, to Fort Pierce, Florida. Within this area, the fishing grounds include the sounds and estuaries and a coastal strip within 10 miles of the shore. However, most of the ocean fishery is conducted between the shoreline and about six miles offshore. The fishery is almost continuous from about Bull's Bay, South Carolina, to the St. John's River, Florida, while in the northern and southern extremes of the range, the fishing grounds are scattered.

NORTH CAROLINA: North Carolina has two principal fishing areas.^{4/} One, which represents the northern limit of the fishery, is in the Beaufort-Morehead City section. Here most of the fishing is in the inside waters around the mouths of the Neuse and Newport Rivers, in Core and Pamlico Sounds, and in the coastal waters a short distance each side of Beaufort Inlet. The second area is in the coastal waters off the mouth of Cape Fear River, with Southport as the base for operations. Principal fishing grounds extend about 10 miles to the west from Cape Fear Point; but scattered fishing is done down to about Little River Inlet.

About 84 percent of the total yearly catch is obtained from August through November with the peak during October.

SOUTH CAROLINA: The northern half of the South Carolina coastline, from Little River Inlet to Cape Romain, is not a productive area for shrimp. In this section, there is, off Winyah Bay entrance, a small fishery which operates from Georgetown. The principal fishing grounds are located in the coastal waters from off Bull's Bay to Tybee Roads. While continuous fishing grounds are found throughout this southern half of the coastline, the more productive grounds are from Stono Inlet south to the Georgia line. Many of the South Carolina sounds would be included in the fishing areas, but these are closed to fishing by State regulation. Principal landing ports are Charleston and Beaufort.

^{4/}During 1948, large quantities of shrimp were taken in the upper part of Pamlico Sound and landed at Engelhart and nearby ports (Editors).



About 84 percent of the total production is taken from August to November with September and October the peak months.

GEORGIA: The entire coast of Georgia is fairly uniform in the production of shrimp. Fishing grounds include the sounds and coastal waters from Tybee Roads on the north to St. Mary's River on the south. Principal landing ports are Thunderbolt, Darien, Brunswick, and St. Marys.

As in North and South Carolina, the predominant run of shrimp—about 66 percent of the total production—is found during the months of August to November with the peak production in September and October. There is a spring and early summer season during May and June of greater intensity than in North and South Carolina.

FLORIDA: East Coast: The northern part of the Florida coastline down to the St. John's River is very similar to that of Georgia, and the fishery is continuous to this point. To the south of St. John's River, the coastline is broken by major inlets at two rather widely separated points; one at St. Augustine, and another at New Smyrna. South of New Smyrna, Fort Pierce is the only inlet where shrimp fishing is active. This is the southern limit of the fishery. The principal fishing grounds are centered around these inlets, except at Cape Canaveral, where there is no inlet. Between the St. John's River and New Smyrna, shrimp are taken at some points between inlets, but, in general, these are not so productive as the grounds near the entrances. From a short distance south of New Smyrna Inlet to the southern side of Cape Canaveral, very little fishing is done. The Cape Canaveral ground extends south from the tip of the Cape to about Melbourne. South of Melbourne, there is no fishery of consequence, although some shrimp are taken off Fort Pierce, where a few spots of suitable bottom are to be found. South of Fort Pierce, there is no fishery, owing in part to the rocky and coral nature of the bottom. Principal landing ports in Florida are Fernandina, Mayport, St. Augustine, and New Smyrna.

The period of greatest production in the north Florida area—from the Georgia boundary to the St. John's River—is comparable to that of Georgia, roughly, August through November; and in the central Florida area—St. Augustine to Cape Canaveral—it occurs from December to March with the peak during December and January.

Gulf of Mexico

The shrimp fishery in the Gulf of Mexico embraces an area from Apalachicola, Florida, to the Mexican border in Texas, and includes sounds, bays, bayous, and coastal waters out to a distance of approximately 50 miles (Figure 2). In every State, except Louisiana, however, the coastal fishery does not extend much beyond 10 miles from shore. The grounds are not continuous over this entire section, but tend to be scattered at the two extremes and more concentrated in the central area, with Louisiana the center of production.

FLORIDA: West Coast: The main production center on the Florida Gulf Coast is located at Apalachicola, where fishing is done in Apalachicola Bay and in the coastal waters from Cape St. George to St. Joseph's Point. A small amount of fishing is also done in the waters off the entrance to Pensacola Bay. Along the peninsula south of Apalachicola, there is no established fishery, because of unfavorable bottom and an apparent scarcity of shrimp.

The period of greatest production runs from September to December, with a smaller spring and early summer season during May and June.

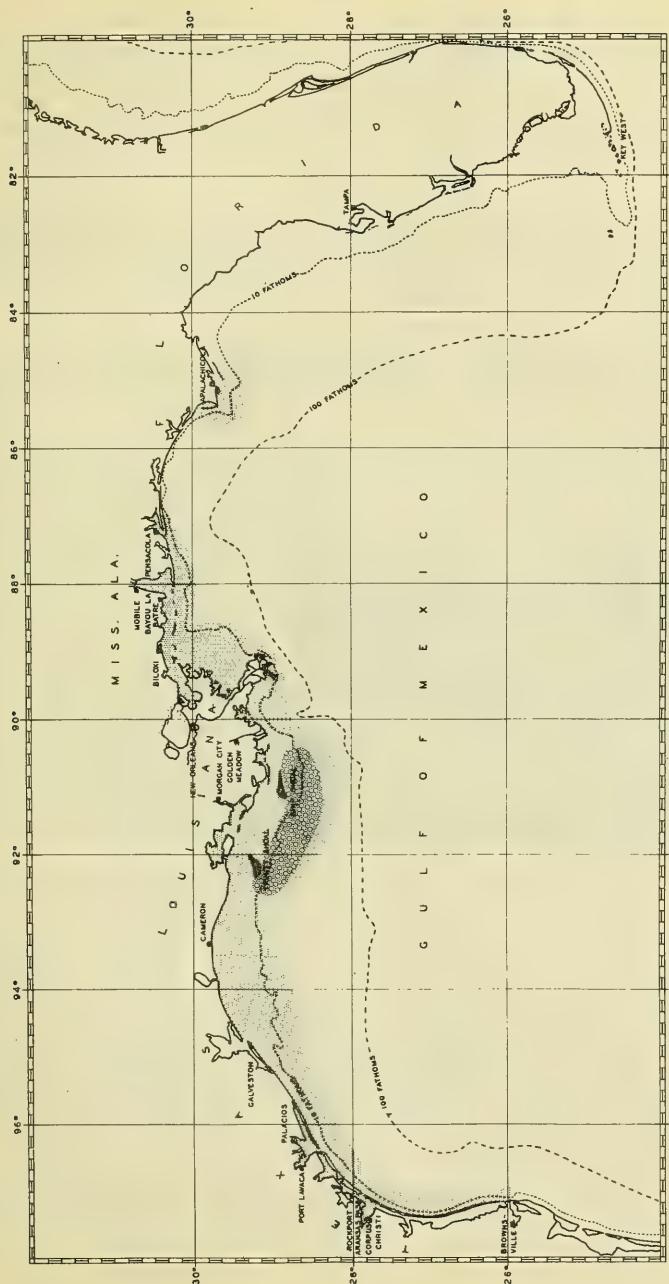


FIGURE 2 - MAP OF THE NORTHERN GULF OF MEXICO SHOWING MAIN FISHING PORTS AND SHRIMP FISHING GROUNDS (STIPPLED AREAS); DOUBLE STIPPLING INDICATES THE AREA MOST HEAVILY FISHED BY THE LOUISIANA OFFSHORE FLEET

ALABAMA: Fishing grounds in Alabama are rather limited, owing to the short coastline. The principal fishing grounds are in Mobile Bay and Mississippi Sound; of lesser importance is the coastal region adjacent to Mobile Bay entrance. Principal landing ports are Bayou LaBatre, Mobile, Coden, and Bon Secour.

The heaviest production occurs from August to December with August to November accounting for approximately 82 percent of the total. The monthly catch during this period is about equally divided.

MISSISSIPPI: The main fishing grounds of Mississippi are Mississippi Sound and the coastal waters off Horn and Ship Islands. Mississippi craft fish extensively in Louisiana waters to the east of the Mississippi River. Principal landing port is Biloxi; but shrimp are also received in lesser quantities at Pascagoula, Pass Christian, Bay St. Louis, and Gulfport.

The predominant run is from September to December with the peak during October and November. A second, smaller run occurs during the spring and early summer, centering in May.

LOUISIANA: The fishing grounds in Louisiana can be separated into two divisions: those lying to the east of the Mississippi River, and those to the west. The principal areas to the east of the River are Chandeleur and Breton Sounds, and the coastal waters between the Chandeleur Islands and the Mississippi Delta. To the west of the River lie perhaps the richest and most extensive fishing areas to

be found anywhere in the shrimp fishery. This western area can be separated into two rather distinct sections: the inside and the offshore grounds.

The most important inside grounds are Barataria, Timbalier, Terrebonne, and Caillou Bays, and many of the connecting bayous. Some fishing is also carried out in the Atchafalaya and Vermillion Bay areas. To the west of Vermillion Bay, no productive inside grounds are to be found.



ATTACHING CHAFING GEAR ON BAG OF SOUTHERN SHRIMP TRawl

The coastal waters from the Mississippi River to the Texas line comprise the offshore grounds. While shrimp are caught over this entire stretch of coastline, the most productive grounds are the Ship and Trinity Shoal areas, lying roughly between $90^{\circ}30'$ and $92^{\circ}30'$ west longitude. The vessels work in from 2 to about 30 fathoms of water, but most fishing is done between 5 and 15 fathoms. Landing ports in Louisiana are widely scattered and more numerous than in any other section of the fishery, and no attempt will be made here to name them all. The major centers include the following: the New Orleans area, which draws shrimp from the Mississippi River Delta and Barataria Bay sections; Golden Meadow; Houma; Morgan City-Berwick-Patterson; and Cameron.

Of special interest is the Louisiana offshore fishery, which began in 1938, and was initiated largely by vessels and people who migrated from Florida and

settled in the Morgan City area. This includes the cities of Morgan City, Berwick, and Patterson, all lying within a few miles of each other. While this area will no doubt continue to be the most important base for the offshore fishery because of its central location with respect to the best fishing grounds, recently increasing numbers of offshore boats have been appearing in other sections of the State.

The development of the offshore fishery has materially increased the total poundage of shrimp taken in Louisiana waters, as will be noted from the annual catch records for the past 10 years (Table 2). This increase has come from a portion of the shrimp fishing grounds which before had been almost entirely unutilized. Since the larger shrimp, which bring the highest prices, are taken in the offshore fishery, the increase in value to Louisiana has been greater than the increase in poundage.

Table 2 - Shrimp Catch of the South Atlantic and Gulf States, by States

Year	North Carolina	South Carolina	Georgia	Florida	Subtotal for S. Atlantic	Alabama	Mississippi	Louisiana	Texas	Subtotal for Gulf	Grand Total
(In thousands of pounds)											
1880	63	630	56	72	821	1/	1/	534	638	1/	1/
1887	120	338	185	1/	1/	1/	1,145	6,810	255	1/	1/
1888	124	359	191	1/	1/	44	1,093	6,943	259	1/	1/
1889	135	380	150	78	743	30	794	7,239	242	8,305	9,048
1890	144	372	152	65	743	1/	614	6,662	176	1/	1/
1897	146	375	68	39	628	41	1,903	4,487	361	6,792	7,420
1902	84	370	344	3,030	3,828	0	4,424	7,635	291	12,350	16,178
1908	371	452	528	4,354	5,705	37	4,121	8,581	119	12,857	18,562
1918	940	55	5,793	12,118	18,906	1,266	9,147	18,520	164	29,097	48,003
1923	1,658	355	10,668	13,905	26,586	8,182	9,879	27,753	3,422	44,236	70,822
1927	1,276	1,857	12,279	17,169	32,381	5,162	9,234	40,259	11,832	66,486	98,867
1928	845	431	9,526	25,384	36,186	5,972	11,767	53,779	7,774	79,292	115,478
1929	897	288	12,378	18,619	32,182	4,396	13,101	49,456	9,415	76,368	108,550
1930	1,299	793	8,853	16,849	27,793	2,982	8,489	38,664	10,189	60,324	88,117
1931	338	2,635	5,471	18,853	27,297	2,475	17,716	35,148	13,814	59,153	96,450
1932	292	1,501	3,602	18,136	29,531	3,382	14,910	38,096	9,244	64,732	88,263
1934	2,564	1,801	6,843	15,292	27,500	4,557	15,330	55,572	16,359	91,818	119,318
1936	3,815	1,101	9,715	20,725	35,356	1,869	17,489	53,430	9,963	82,755	118,111
1937	4,184	1,201	9,504	14,037	28,926	3,104	23,558	68,781	16,905	112,348	141,274
1938	4,569	3,723	10,426	10,143	28,361	5,644	279,902	81,379	16,365	111,290	140,151
1939	4,811	4,090	10,802	8,782	28,485	2,124	5,676	100,613	11,173	119,586	148,071
1940	4,157	1,784	9,336	8,369	23,646	4,565	8,566	98,986	14,779	126,895	150,541
1945	10,614	4,596	16,392	13,662	45,364	4,439	6,595	116,904	15,722	143,660	189,024

¹Data not available.

²Prior to 1938, shrimp taken by Mississippi craft in Louisiana waters were included in the catch for Mississippi. Since 1938, such catches are included in the Louisiana production figures.

Due to the nature of the fishery, shrimp are landed in quantity during most of the year. However, in common with most of the other sections of the fishery in the Gulf, there are two main seasons. The greatest production occurs during the period from September to January. Beginning in May and extending to July, there is a second, smaller run.

TEXAS: The Texas fishing grounds include both inside bays and coastal waters. The principal inside areas are Matagorda, San Antonio, Aransas, and Corpus Christi Bays. Some fishing is carried on along the entire length of the coast, but the fishery is principally in the Galveston, Pass Cavallo, Aransas Pass, and Port Isabel sections. The more important landing ports are Galveston, Palacios, Port Lavaca, Aransas Pass, Rockport, Freeport, and Port Isabel.

The period of greatest production is from September to November with the peak during September and October. There is a second though smaller season of abundance having its beginning in April, extending to July and with the maximum during May and June.

SPECIES OF SHRIMP ENTERING THE CATCH AND RELATIVE IMPORTANCE OF EACH

Although numerous species of shrimp are found along the South Atlantic and Gulf Coasts, only five are of commercial importance. These are: the common shrimp (*Penaeus setiferus*); the three grooved shrimp (*Penaeus aztecus*, *Penaeus duorarum*, and *Penaeus brasiliensis*); and the sea-bob (*Xiphopenaeus kroyeri*). Until recent years, all of the grooved shrimp were included under the single species (*P. brasiliensis*). Burkenroad (1939) demonstrated that there were actually three distinct species. All three of these "*brasiliensis* group" species occur on the South Atlantic Coast, but only two, *P. aztecus* and *P. duorarum*, have been recorded for the northern Gulf Coast. The fishermen do not distinguish between these three species. To the industry, they are all classed as "brasiliian" shrimp or "brownies."

Of the shrimp commonly taken by the trawlers but of no commercial importance, are several species of *Eusicyonia*, of which *E. brevirostris* is the most abundant, and two species of *Trachypenaeus*, of which *T. constrictus* is predominant on the South Atlantic and *T. similis* on the Gulf Coast. There appears to be no common names in general use for these species, although the *Eusicyonia* are sometimes referred to as marble or hardback shrimp.

All of these species belong to one family, the Penaeidae. For means of identifying them see Anderson and Lindner (1943).

The common shrimp, *P. setiferus*, is outstandingly the most important commercial species. It is impossible to obtain separate figures on the production of the various commercial species landed throughout the fishery as the catch is not recorded or reported by species. On the basis of our own trawling operations, observations on catches landed, and estimates made by dealers, it appears that the common shrimp accounts for at least 95 percent of the total catch and probably more.

The grooved shrimps and the sea-bob make up the remainder of the catch, the sea-bob being the less important. Since it is only in Louisiana that the sea-bob is utilized--and here for drying purposes only, being discarded as too small for other purposes--we estimate that 1 percent of the total catch is made up of sea-bob and 4 percent of the grooved shrimp.

Of the three grooved shrimp, *P. aztecus* appears to be the most abundant over the entire range of the fishery, with *P. duorarum* next and *P. brasiliensis* third. The largest catches of grooved shrimp are taken during the late spring and early summer on the inside fishing grounds where the young appear before the young of the common shrimp. Some quantity is taken in the outside waters, especially in Louisiana by the offshore fleet in the deeper waters. Louisiana, undoubtedly, has a larger catch of grooved shrimp than any other State. Near Beaufort, North Carolina, at times during the summer, the grooved shrimp are caught in greater quantities than are the common shrimp.

CATCH STATISTICS

All the available data on quantity of shrimp produced in the South Atlantic and Gulf States are shown in Table 2, by States, for certain years 1880 to 1945. As can be seen from Table 3, which gives a distribution of the shrimp catch by areas and States for 1945, Louisiana is producing about two-thirds of the total catch of the entire fishery.

As shown in Table 2, the introduction of the otter trawl in 1912-15 marked the beginning of a great expansion in the shrimp fishery. Production climbed rapidly until 1929. The low price of shrimp during the depression years which

Table 3 - Percentage of Shrimp Catch by States for the South Atlantic and Gulf for 1945
(In thousands of pounds)

State	S. A. & Gulf States		South Atlantic States		Gulf States	
	Pounds	Percent	Pounds	Percent	Pounds	Percent
Louisiana	116,904	61.8	-	-	116,904	81.4
Georgia	16,392	8.7	16,392	36.1	-	-
Texas	15,722	8.3	-	-	15,722	10.9
Florida	13,662	7.2	13,662	30.1	-	-
North Carolina	10,614	5.6	10,614	23.4	-	-
Mississippi	6,595	3.5	-	-	6,595	4.6
South Carolina	4,696	2.5	4,696	10.4	-	-
Alabama	4,439	2.4	-	-	4,439	3.1
Total	189,024	100.0	45,364	100.0	143,660	100.0

followed furnished little incentive to the fishermen. As a result, production dropped off about 25 million pounds. By 1934, the catch was restored to the former high level, and continued to increase until 1940. Since 1940, the production has shown minor fluctuations probably related to war conditions, but in the main there has been a steady increase reaching a record peak in 1945. In the States for which there are records complete to the present time, it is impossible to detect what might be called "definite signs of depletion" of the resource.

Other statistical data, such as the number of vessels, trawls, seines, fishermen, shore plants, fishery products, etc., for the years 1880-1932, may be obtained from Johnson and Lindner (1934). Data for later years are covered in the series "Fishery Statistics of the United States."

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STUDIES ON METHODS OF EXTRACTING VITAMIN A AND OIL FROM FISHERY PRODUCTS^{1/}

PART II-EXPERIMENTS ON THE SOLVENT EXTRACTION OF LOW-FAT LIVERS^{2/}

By F. B. Sanford* and A. D. Mandol**

ABSTRACT

Using the shaking method for the solvent-oil extraction of low-fat livers some of the variables investigated were: the type of solvent, weight of sample, amount of drying agent, type of dispersing agent, and blendering time. Lyophilization to remove moisture from the sample prior to solvent extraction was also studied. A complex inter-relationship exists between the variables. For example, whether or not a drying agent or a dispersing agent is of critical importance depends upon the nature of the solvent used. Ethyl ether requires a drying agent while a dispersing agent is necessary with petroleum ether. In fact, the solvent actions of petroleum ether appear to be reduced when a drying agent is employed.

INTRODUCTION

In the analytical determination of vitamin A and oil in livers and viscera, two methods are employed. One is used with materials containing less than 40 percent oil, while the other is used when the oil content is greater. In the low-oil method, the material is repeatedly extracted with portions of fresh solvent, while in the high-oil method, the material is simply placed in a bottle in contact with the solvent and shaken until equilibrium is established. The low-oil method is tedious and cumbersome when a large number of analyses are run at one time. In contrast, the high-oil method is relatively simple and ideal for mass production. From earlier work, it appeared that the high-oil method might be adapted to low-oil materials if the type of solvent could be improved. The purpose of the present experiments was to find a basis for choosing the proper solvent.

In the analysis of liver or viscera for oil and vitamin A, usually a quart sample of the material is submitted to the laboratory. Here the sample is homogenized by a Waring-type blender. This process reduces the liver, or viscera material, to small particles, and it also liberates oil. The essential problem in solvent-extraction is to dissolve from the particles the oil and vitamin A not set free in the blendering process.

An assumption in the present work was that the moisture associated with the particles forms one of the principal obstacles to the action of the solvent. For

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^{1/}Part I - "Vitamin A Potencies of Oils from Grayfish Livers Obtained by Extraction with Petroleum Ether and by Cooking with Water," by D. Miyachi and F. B. Sanford. Appeared in Commercial Fisheries Review, September 1947. Available as Separate No. 186.

^{2/}This paper was presented at the Western Session of the 114th national meeting of the American Chemical Society at Portland, Oregon, on September 15, 1948.

this reason, solvents were arbitrarily divided into three groups: those insoluble in water, like petroleum ether; those partially soluble, like ethyl ether; and those completely soluble, like acetone.

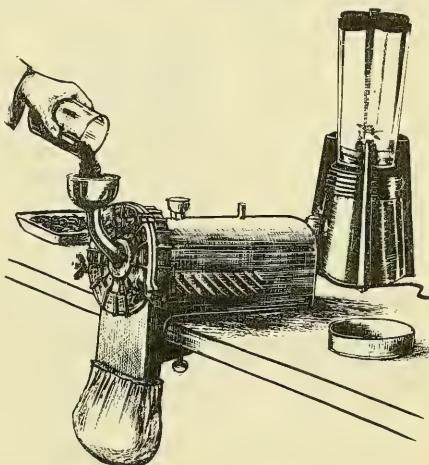
The general procedure was to compare the results obtained with these three types of solvents and to see what difficulties were encountered. Due to limitations in time, only the oil aspect was considered, and the problem of vitamin A extraction was ignored. Further, to save time, portions of the same liver material were used throughout the experiments. This was accomplished by homogenizing some low-oil liver, sealing the resulting material in cans, and preserving it by refrigeration. The general procedure of extraction was that followed in the high-oil method. In order to obtain an independent estimate of the amount of oil in the material, a proximate analysis for ash, protein, and moisture was made, and the oil content was estimated by difference.

EXPERIMENTAL

In the preparation of the samples, 30 pounds of rockfish livers were passed through a meat chopper and further disintegrated and homogenized by means of a propellor-like device having sharpened edges and rotated by an electric motor. The resulting material was sealed, under atmospheric pressure, in half-pound flat cans. (So much air had been beaten into the material that it frothed over the sides of the containers when a vacuum pack was attempted.) To keep the liver from spoiling, the flats were placed in a cold room maintained at 0° F. Before use, each can was left overnight in a refrigerator held slightly above freezing so that the material in the can could thaw.

The technique for oil extraction was to remove the liver from the can and to homogenize this material further by means of a Waring-type blender. A portion was transferred to a square bottle of 160 ml. capacity and weighed. A measured volume of solvent was added; and, in certain experiments, anhydrous sodium sulfate was used as a drying agent. The sulfate was always added after the solvent, as the reverse procedure tends to cause the liver material to clump into balls. After stoppering the bottle by means of a cork, the bottle was machine-shaken for one hour. Centrifuging the bottle and its contents settled the suspended matter. A 5 ml. aliquot was taken and evaporated in a 50 ml. beaker over an air bath. Three minutes after the solvent was gone, the beaker was removed, allowed to cool to room temperature, and weighed.

The proximate analysis for ash, protein, and moisture (Table 1) followed the regular procedures established by the Association of Official Agricultural Chemists.



In Experiment 1 (Table 2), petroleum ether was used as the solvent. Experiment 2 differed only in that the mass which tended to form on the side of the

bottles (the bottles lay on their sides in the shaking machine) was broken up by shaking the bottles occasionally by hand. In Experiment 3, there was more sulfate, a smaller sample was taken, and sand was used as a dispersing agent. In Experiment 4, the sulfate was omitted. In Experiment 5, the

Constituent	Relative Amount of the Constituent	
	% by Weight	
Ash	1.12	
Protein	13.42	
Moisture	67.33	
Oil (by difference)	18.13	

^{1/}Analyses made by Virgil Uyenco

sample was again reduced in size and pumice was used. In Experiment 6, kieselguhr was substituted for the pumice. In Experiments 7 through 9, the time of blending was varied. In Experiments 10 through 16, different amounts of water were used as a dispersing agent. In Experiment 17, a small amount of sulfate was added to the water. In Experiment X, the free moisture was removed from the

Table 2 - Data Obtained in the Extraction of Oil from Low-Fat Liver by Means of the Shaking Method^{1/} and the Use of Petroleum Ether as a Solvent

Identity of the Experiment	Approx. Wt. of Samples	Approx. Wt. of Anhydrous Sodium Sulfate Used	Variables Investigated	AMOUNT OF OIL EXTRACTED						Mean of Replicates	
				Replicates							
				1	2	3	4	5	6		
Symbol	Grams	Grams		Percent	Percent	Percent	Percent	Percent	Percent	Percent	
1	20	30	Solvent	4.83	3.63	3.55	4.93	5.04	5.45	4.77	
2	20	30	Dispersion (clumping)	12.32	12.35	15.05	13.30	12.70	16.30	13.57	
3	7	40	Dispersion (sample size, amt. of sulfate, sand)	15.45	15.38	15.63	14.11	12.79	14.09	14.57	
4	7	0	Dispersion (drying agent, sand)	17.20	17.13	17.17	17.19	16.89	17.07	17.11	
5	2.5	0	Dispersion (sample size, powd. pumice)	17.41	17.36	17.15	17.31	17.52	17.28	17.34	
6	2.5	0	Dispersion (kieselguhr)	15.88	16.47	15.41	15.19	14.00	14.60	15.26	
7	1.6	0	Dispersion (pumice, 1 min. blending)	15.58	17.50	17.55	17.52	-	-	17.54	
8	1.6	0	Dispersion (4 min. blending)	17.58	17.32	17.75	17.49	-	-	17.42	
9	1.6	0	" (12 " "	17.80	15.36	15.80	-	-	-	15.85	
10	2	0	" (0 oil, water)	5.77	4.49	6.25	-	-	-	6.92	
11	2	0	" (1 " "	9.38	8.67	8.71	-	-	-	8.92	
12	2	0	" (2 " "	10.09	9.51	9.62	-	-	-	9.74	
13	2	0	" (4 " "	15.81	15.79	17.41	-	-	-	16.33	
14	2	0	" (8 " "	16.91	16.91	16.91	-	-	-	16.91	
15	2	0	" (16 " "	17.08	16.51	16.41	-	-	-	16.66	
16	2	0	" (32 " "	16.85	17.01	16.95	-	-	-	16.93	
17	2	3	" (16 " ", sodium sulfate)	17.08	17.19	17.04	17.10	-	-	17.10	
X ^{1/}	5	0	Penetration (lyophilization)	16.76	16.80	-	-	-	-	15.78	

^{1/}Results in Experiment X were obtained by lyophilization instead of by the shaking method. Made by Dirk Verhagen.

sample by lyophilization, the sample was refluxed with a measured quantity of the petroleum ether, and the amount of oil present was estimated from data obtained when the solvent was evaporated from an aliquot and the resulting oil residue was weighed.

In Experiments 18 and 19 (Table 3), the conditions were the same as in Experiment 1 (Table 2), except that ethyl ether was used instead of petroleum ether.

Table 3 - Data Obtained in the Extraction of Oil from Low-Fat Liver by Means of the Shaking Method^{1/} and the Use of Ethyl Ether as a Solvent

Identity of the Experiment	Volume of Solvent Used	Weight of Sample	Variables Investigated	AMOUNT OF OIL EXTRACTED						Mean of Replicates
				Replicates						
	1	2	3	4	5	6	Percent	Percent	Percent	Percent
Symbol	ml.	Grams								
18	50	20	Homogeneity of samples	17.41	17.69	17.79	17.60	17.70	17.80	17.55
19	50	20	" "	17.60	17.70	17.68	17.61	17.60	17.60	17.60
20	100	2	Sample size	18.10	17.48	18.50	17.76	17.99	17.35	17.86
21	50	20	Moisture effect (no sodium sulfate)	17.49	17.56	17.53	17.39	-	-	17.49
X ^{1/}	300	5	" " (lyophilization)	17.23	17.66	17.87	17.88	17.92	18.10	17.78

^{1/}Results in Experiment X were obtained by lyophilization instead of by the shaking method. Made by Dirk Verhagen.

In Experiment 20, the sample size was reduced. In Experiment 21, anhydrous sodium sulfate was omitted, and in Experiment Y, the sample was lyophilized and extracted as in Experiment X (Table 2).

In Experiment 22 (Table 4), the conditions were the same as in Experiments 1 and 18, except that acetone was used as the solvent.

Identity of Experiment	Volume of Solvent Used	Weight of Sample	Variables Investigated	AMOUNT OF OIL EXTRACTED						Mean of Replicates	
				Replicate							
				1 Percent	2 Percent	3 Percent	4 Percent	5 Percent	6 Percent		
Symbol 22	50 ml.	20 Grams	Solvent	8.64	8.51	8.93	8.32	8.44	8.67	8.56	

RESULTS

The proximate analysis (Table 1), indicated that about 18 percent oil was present in the sample. This value was obtained by determining the percentage of ash, protein, and moisture, and subtracting the sum of these figures from 100.

In Experiment 1 (Table 2), using petroleum ether as a solvent, only 4.77 percent oil was extracted instead of 18 percent as indicated by proximate analysis. The bottles lay on their sides in the shaking machine, and in this Experiment, the liver material covered the bottom side in much the same manner as putty. When the bottle was machine-shaken, the solvent slid over the top of this mass. In Experiment 2, shaking the bottles by hand occasionally prevented the putty-like mass from forming and resulted in better oil extraction. In Experiment 3, the essential change was the addition of sand, which aided in the dispersion of the liver particles. In Experiment 4, omission of sodium sulfate resulted in less coagulation of the liver particles and greater oil extraction. In Experiment 5, the powdered pumice gave greater dispersion than the sand. In Experiment 6, the substitution of the kieselguhr appeared to result in less extraction. The kieselguhr appeared to have a tendency to make the liver particles coagulate. In Experiments 7, 8, and 9, it appeared that blending tends to heat the liver material and to cause coagulation. The result was that less oil was extracted on prolonged blending. In Experiments 10 through 16, it was found that water was a fairly good dispersing agent. In Experiment 17, the addition of sodium sulfate to the water appeared to result in better oil extraction. In Experiment X, lyophilization of the sample resulted in fair extraction of the oil.

Experiments 18 and 19 were replicates of each other. The solvent used was ethyl ether, and the amount of oil extracted was the same in both Experiments. In Experiment 20, reduction of the sample size appeared to have resulted in slightly more oil being extracted. In Experiment 21, omitting sodium sulfate reduced slightly the amount of oil extracted. In Experiment Y, lyophilization resulted in good oil extraction.

In Experiment 22, acetone was used as the solvent. While the yield of oil was poor, the physical appearance of the sample was good in that there seemed to be no tendency for the liver to coagulate.

DISCUSSION

Due to uncertainties in the analysis of ash, protein, and moisture, and also due to the fact that certain potential constituents such as glycogen, etc., were not taken into account, the figure 18.13 percent arrived at by proximate analysis (Table 1), can be considered only as an estimate as to the amount of oil present.

Using petroleum ether as a solvent (Table 2), one of the principal difficulties appears to be that of penetration. The moisture present in the liver would appear to prevent the penetration of this solvent. Hence, when petroleum ether is used, the liver should be dispersed so as to present as large a surface of liver material

to the action of the solvent as is possible. Shaking the bottles by hand (Experiment 2) helps as does also the addition of sand. Anhydrous sodium sulfate has a tendency to cause the liver to form clumps. Since petroleum ether dissolves almost no water, anhydrous sodium sulfate is useless when this solvent is used and should probably be omitted. Kieselguhr (Experiment 6) does not appear to be as good a dispersing agent as sand or pumice. Blending (Experiments 7, 8, and 9) tends to increase the temperature which in turn tends to coagulate the liver particles. It would appear that the proper time of blending is that which will produce optimum homogenization with minimum heating. Water appears to be almost as good a dispersing agent as sand. However, when the action of water on liver is viewed under a microscope, the water seems to have a coagulating effect. The addition of salts, such as sodium sulfate to the water (Experiment 17), may aid dispersion as more oil appears to be extracted in this case. Lyophilizing the sample appears to aid the solvent to penetrate the material, but penetration does not appear to be complete, as only 16.78 percent oil was obtained.

In Experiments 18 and 19 with ethyl ether, the results indicate that the liver material is the same in all cans. In Experiment 20, there is an indication that reduced sample size results in better extraction. Experiment 21 indicates that moisture in the solvent may reduce oil solubility. Experiment Y also supports this view, because the oil extracted appears to increase when most of the moisture is removed.

In Experiment 22, with acetone, the oil extracted is less than half that obtained with ethyl ether. A possible explanation is that anhydrous sodium sulfate may not function effectively with acetone. An increase in the moisture content of the solvent could result in less oil solubility.

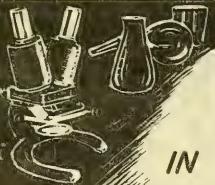
CONCLUSIONS

While with the aid of dispersing agents, petroleum ether can be made to function fairly effectively, it does not appear that the liver particles can be dispersed finely enough to result in complete solution of the oil when this solvent is used. Hence, pure petroleum ether does not appear to be a satisfactory solvent. Ethyl ether is better than petroleum ether, but improvements seem possible, either by the use of a more efficient drying agent or by the admixture of another solvent. Pure acetone, under the conditions of the experiments, give poor results. However, a smaller-sized sample or the use of a drying agent more effective than anhydrous sodium sulfate may improve extraction. Apparently what is needed is for the solvent to have sufficient affinity for moisture to allow penetration, but for it not to dissolve so much moisture as to reduce oil solubility.



PACKAGING FROZEN FISHERY PRODUCTS

During storage, fishery products undergo changes of two general types, namely, chemical and physical. Chemical changes include those brought about by the action of bacteria, those due to the action of naturally occurring enzymes, denaturation of the protein and oxidative changes in the fat or oil. The principal physical changes are desiccation or drying out of the flesh and ice-crystal formation.



RESEARCH IN SERVICE LABORATORIES

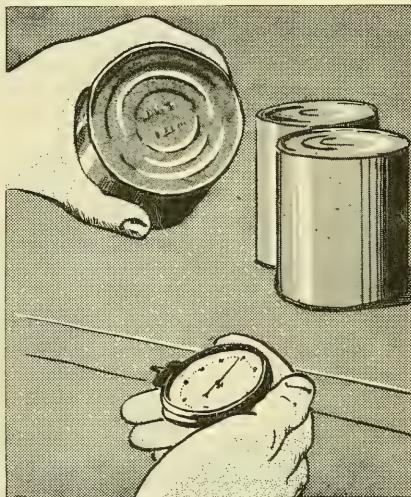
December 1948

Seattle, Wash.

Samples of commercial and experimental packs of frozen and canned king crab were examined and scored. Important factors in the preparation of a quality frozen and canned pack appeared to be freshness of the crabs, prompt cooking and cooling, thorough cleaning and removal of discolored flesh and coagulated material, and care in packing to minimize air voids in the meat.

Bluish discoloration of coagulated material was the most important factor in lowering the score of various canned packs. Addition of citric acid or acetic acid to the can, or use of acid dips before packing, did not improve the color.

Canned crab meat prepared from whole crab legs held in frozen storage for 25 days before canning was rated equal in quality to control samples. Use of crabs which had recently molted did not lower the quality for canning. Use of crabs held 48 hours on deck before canning resulted in poor color and a definitely lower quality canned pack.



CHECKING VACUUM OF CANNED FISHERY PRODUCTS

* * *

Red and silver salmon, which had been frozen by immersion in 75 percent saturated brine at 60° F. and subsequently stored in the brine for 3 weeks, were thawed in air and canned by the usual process. Examination of the samples after 2 weeks indicated that salt penetration had been superficial during the freezing and storage period. Effect of the pre-treatment was noticeable mainly in the poorer color of the surface flesh and a very slight after-taste. Odor, texture, and shrinkage during canning were satisfactory.

Boston, Mass.

Frozen haddock, cod, hake, pollock, and cusk fillet samples from fish frozen in the round at sea and from fish that had been gutted and iced were examined after two months storage. Organoleptic tests showed that the fillets from fish frozen at sea were as good, and, in some cases, superior in quality to fillets from fish iced at sea.

* * *

It was noticed in the taste tests that fillets of fish frozen at sea had a "sea-salt" flavor of the type associated with fresh-caught fish. It is possible that icing fish causes a leaching out of some of the desirable constituents which contribute to the flavor of the fish. Tests are being conducted to throw some light on this phenomenon.

College Park, Md.

The Steering Committee of the Committee on Sanitation and Pollution Control of the Atlantic States Marine Fisheries Commission, at an all day conference at this Laboratory, outlined plans for the preparation of a sanitation manual for the fresh and frozen fish industry. Since one of the results of better sanitation would be improvement in quality, it was felt that the frozen fillet industry should receive assistance first.

* * *

Analysis of basic school lunch fish preparations showed them to contain 12.5 percent to 15 percent protein, as served, and to furnish approximately 150 calories per 4-ounce (100-gram) portion.

Ketchikan, Alaska

Studies to develop improved processing methods for butter clams were continued. Preliminary results indicate that a marketable product can be prepared if the clams are steamed for 10 minutes at 250° F., the siphons are completely removed, the body meats are well washed and then minced, the meats are packed with approximately equal quantities of 3 percent brine, and then steam processed for 50-80 minutes (depending on the size of the can) at 250° F. (15 pounds pressure). Further experiments are being conducted to check these conclusions and to determine methods which are even more efficient in producing high quality products.





TRENDS AND DEVELOPMENTS

Additions to the Fleet of U. S. Fishing Vessels

During November 65 vessels of five net tons and over received their first documents as fishing craft, 33 less than in the previous month, and 4 less than in November 1947, according to the Bureau of Customs of the Treasury Department. Louisiana led with 8 vessels, followed by Florida and North Carolina with 7 each. A total of 1,124 vessels received their first documents as fishing craft during the first 11 months of 1948 compared with 1,226 during the same period in 1947.

Vessels Obtaining Their First Documents as Fishing Craft

Section	November		Eleven mos. ending with Nov. 1948	Total/ 1947/	
	1948	1947/		1947/	1947/
	Number	Number	Number	Number	Number
New England	6	1	49	50	55
Middle Atlantic	3	5	40	61	64
Chesapeake Bay	6	6	56	76	83
South Atlantic and Gulf	37	35	511	452	486
Pacific Coast	7	14	336	401	415
Great Lakes	4	2	46	42	45
Alaska	2	5	77	117	123
Hawaii	-	1	9	26	28
Puerto Rico	-	-	-	1	1
Total	65	69	1,124	1,226	1,300

1/Revised.

Note: Vessels have been assigned to the various sections on the basis of their home port.



Albatross III

MAINE AND NEW HAMPSHIRE INSHORE FISHABLE AREAS SCARCE: The Albatross III, on its fourteenth cruise (December 1-9, 1948), found the number of fishable areas along the inshore regions of Maine and New Hampshire scarce. During the seven-day period from December 1, scientists aboard the research vessel started the fish population census of the Gulf of Maine. This cruise concentrated on the inshore areas from Cape Ann, Mass., to Penobscot Bay, Me. Nine stations were made in which the otter-trawl net was operated. Approximately six other prospective stations were cruised by the vessel and recordings of the bottom contours made with the depth recorder. These areas and most of the regions near them proved to be too rough for successful operation of the nets.

The principal species caught in the nine stations surveyed were whiting, rosefish, dab, and hake. The Jefferies Bank area, about 30 miles southeast of Matinicus Rock, yielded fish in commercial quantities. Water temperatures were obtained with the bathythermograph in all the areas surveyed.

Due to bad weather, the vessel spent two days in the harbor at Rockland, Me.

Scientists of the Fisheries Research Station at Woods Hole, Mass., are now analyzing the data collected on Georges Bank this past summer and fall. The fish population census of this region for 1948 has been completed.



ECA Procurement Authorizations for Fishery Products

Among the procurement authorizations for commodities and raw materials announced by the Economic Cooperation Administration, procurement authorizations for fishery products for January totaled \$820,000. The aggregate authorized since the beginning of the ECA program on April 1, 1948, was \$21,605,911.

ECA Procurement Authorizations for Fishery Products

Product	Country of Origin	Procuring Agency ¹	Recipient Country	Amount Authorized
January 1949				
Fish, canned	U. S. & Possessions	Greece	Greece	\$ 670,000
Fish, salted	Canada & Nfld.	Fr. West Indies	Fr. West Indies	150,000
Total for January 1949				820,000

Additional for November 1948

Vitamin A ² / (Commercial Grade, for stock feed)	U. S.	Netherlands	Netherlands	567,000
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Total ECA Procurement Authorizations for Fishery Products, April 1 - Jan. 31, 1949

Fish, canned	U. S.	Greece	Greece	678,800
Fish, salted	Newfoundland & Canada	Italy, Greece, & Fr. West Indies	Italy, Greece, & Fr. West Indies	7,409,000
Fish, meal	Canada, Iceland, Norway, & Angola	Denmark, Austria, & U. S. Dept. Army	Denmark, Austria, & Bizoned Germany	3,457,361
Oil, herring	Iceland	U. S. Dept. Army	Bizoned Germany	1,694,000
Oil, seal	Newfoundland	France	France	257,600
Oil, shark liver	Latin America, except Argentina & Brazil	-	France	250,000
Oil, technical fish	U. S.	U. S. Dept. Army	Bizoned Germany	100,000
Oil, whale	Netherlands, Belgium & Norway	Austria & U. S. Dept. Army	Austria & Bizoned Germany	7,192,150
Vitamin A (Commercial Grade, for stock feed)	U. S.	Netherlands	Netherlands	567,000

21,605,911

¹Where the recipient country is shown as the procuring agency, the Government of the participating country or its authorized agents or importers do the purchasing.

²Authorized November 4, 1948.



Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, November 1948: Fresh and frozen fishery products purchases during November 1948 by the Army Quartermaster Corps for the U. S. Army, Navy, Marine Corps, and Air Force for military feeding amounted to 1,196,399 pounds valued at \$486,421. Of this amount, only 4,700 pounds were purchased for relief feeding. The total purchases to date, January through November 1948 totaled 15,384,954 pounds valued at \$5,554,666.

Imports of Groundfish, Including Rosefish, Fillets in 1948

Total imports of cod, haddock, hake, pollock, cusk, and rosefish fillets during 1948 amounted to 53,566,452 pounds, 53 percent more than was received in 1947 and 9 percent over the former record 1946 imports (Table 1).

The Tariff Act of 1930 established a duty of $2\frac{1}{2}$ cents per pound for imports of cod, haddock, hake, pollock, cusk, and rosefish fillets, steaks, etc. However, the Second Trade Agreement between the United States and Canada, which became effective January 1, 1939, provided for a duty of 1-7/8 cents per pound for fillets, steaks, etc., of these species, limited in any calendar year to 15 million pounds, or 15 percent of the average annual consumption in the three previous years, whichever is larger. Imports over this amount are at the rate prescribed in the 1930 Tariff Act (i.e., $2\frac{1}{2}$ cents per pound).

Table 1 - Imports of Groundfish, Including Rosefish, Fillets (Preliminary Data)

Country	1948	1947	1946
	Pounds	Pounds	Pounds
Canada	33,408,680	25,909,252	39,427,420
Newfoundland	15,788,865	5,018,471	5,503,414
Iceland	3,964,406	4,165,712	4,234,437
Norway	395,109	-	1,818
Denmark	9,352	-	4,000
Sweden	40	-	-
Total	53,566,452	35,093,435	49,171,089

Table 2 - Import Quotas and Total Imports of Groundfish, Including Rosefish, Fillets, 1939-48

Year	Quota at Reduced Tariff	Total Imports	
		Pounds	Value
1939	15,000,000	9,426,285	\$ 714,420
1940	15,000,000	9,739,853	855,114
1941	15,000,000	9,931,030	963,621
1942	17,174,495	16,674,082	2,336,772
1943	17,804,128	16,323,416	2,705,945
1944	18,210,658	24,545,569	4,913,744
1945	17,668,311	43,169,156	8,657,558
1946	20,380,724	49,171,089	9,929,191
1947	23,906,423	35,093,435	6,192,741
1948	24,930,188	53,566,452	1/

1/ Data not available.

The average annual consumption is arrived at by adding imports of fillets, steaks, etc., of the above species to the domestic production.

The annual quotas of groundfish, including rosefish, fillets permitted to enter the United States at the reduced tariff, and the total imports received during the years from 1939 to 1948 are given in Table 2.

The 1949 quota of these fillets for entry at the reduced tariff rate will be 26,881,369 pounds compared to 24,930,188 pounds in 1948. (See page 67 of this issue.)



Louisiana and Mississippi Oyster Areas Survey

To determine the damage to the oyster beds in Louisiana and Mississippi caused by the 1945 opening of the Bonnet Carre Spillway (a flood control structure of the Corps of Engineers on the lower Mississippi River), the Service's Gulf Oyster Investigations at Pensacola, Fla., began a survey in October 1948. There has been insignificant production since 1945 in the oyster-growing areas of the extreme west end of the Mississippi Sound. Although there has been a fair to good set each season, the young oysters died before attaining market size. The survey shows that these conditions apparently have improved greatly. On certain leased beds in Louisiana, for instance, a fair number of 1947 spat have survived, and until

the first week in December 1948, there was no appreciable mortality in the 1948 set. Farther east on the Mississippi tonging reefs, conditions are still unfavorable for producing market oysters. (See Commercial Fisheries Review, November 1948, page 39.)

In certain areas also inspected west of the Mississippi River, there seems to have been a complete return to normalcy.



Maryland 1948 Canned Fish Production Declines

A preliminary analysis of the 1948 production of canned fish for Maryland shows that the pack of many items declined compared with 1947.

Scarcity of alewives in Chesapeake Bay was blamed for the light pack of this fish. One company confined its output entirely to ocean-caught fish from New Jersey, New York, and Rhode Island. Slackening of demand also affected the pack of whiting and mackerel, and it was reported that whiting had been sold below cost.

An experimental pack of smoked sea herring fillets was canned during the year. The fillets were brined and run on a belt through a smoke chamber and processed in 9-oz. flat cans with salt and water added. This product is selling at approximately 35 cents per can retail.

Last spring, a Maryland cannery added the manufacture of fish meal and oil to its production activities, using the cuttings from local canning factories and "trash fish" from net fishermen.

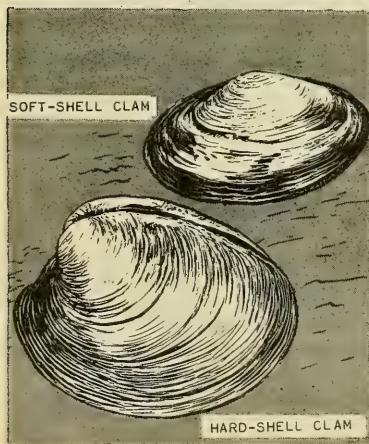


Research Program on East Coast Clams

The Research Program on hard- and soft-shell clams, which was authorized by the 80th Congress, began recently when the Chief of the Investigations reported to Woods Hole, Mass.

Bases for soft-clam studies have been established at Boothbay Harbor, Me., and Woods Hole, Mass., and cooperative research programs have been set up with the States of Maine, New Hampshire, and Massachusetts. Experimental clam farms are being established in the Parker River Wildlife Refuge at Newburyport, Mass., and in the vicinity of Boothbay Harbor, Me. Intensive studies are planned at Sagadahoc Bay, Me., to establish methods for management of the commercial soft-clam fishery.

Hard-shell, or quahog, investigations are being conducted in Narragansett Bay, R.I. These experiments are designed to settle the contro-



versy as to the effects upon immature clams of hand versus power methods of harvesting. Further studies to establish methods for management of the commercial fishery and to develop procedures for quahog farming are being initiated.

Arrangements have also been made for cooperative hard-clam research programs with the States of Connecticut, New Jersey, Virginia, South Carolina, and Florida.



Service Research Vessel to Study "Red Tide"

The 60-foot vessel, Pompano, recently repaired and reconditioned, will be used in the studies of the "red tide," now being conducted at Sarasota, Fla., by the Gulf Fishery Investigations of the Branch of Fishery Biology. On January 15, 1949, it left for its first cruise.

The last quarter of 1948 was spent in moving the office from New Orleans, La., getting it established at Sarasota, making plans for the work, procuring equipment, building up references and reading literature pertinent to these studies, and adding to the staff of the Investigations.

Plans discussed by representatives of the Service and interested agencies and institutions at a conference at Sarasota in early December for cooperative research on the causes of this fish disease are about completed.



Use of "Tracer Atoms" in Nutritional Studies

FISHERY PRODUCTS RATE OF DIGESTION STUDIES: In March 1947, a cooperative research project to study the rate of digestion of certain fishery products was undertaken by staff members of the University of Maryland and the Fishery Technological Laboratory, College Park, Maryland. A fellowship student studying for a Master of Science Degree began work at that time to utilize radio-active phosphorous as a tracer material in this research. This work is under the direction of the Chairman of the Department of Zoology, a Professor of Chemistry of the University of Maryland, and a Pharmacologist of the Service's Branch of Commercial Fisheries. To date, preliminary studies on methods for measuring the radio-active material and a series of physiological experiments with animals have been completed. The radio-active material for the final series of physiological experiments has been ordered and should soon be available for completion of studies.

STUDIES OF THE METABOLISM IN FISH: Plans to use radio-isotopes ("tracer atoms") in studying metabolic processes in trout, oysters, and clams were disclosed on January 24, by the Fish and Wildlife Service.

Two Service biologists are now being trained in radio-isotope techniques at the Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tenn.

One biologist, who is engaged in shellfish investigations at the Service's College Park, Md., Laboratory, will use carbon and phosphorus radio-isotopes to study feeding and digestive processes in oysters and clams. He hopes to develop more effective methods of fattening shellfish for market.

The other biologist, who is in charge of fish nutrition investigations at the Service's Cortland, N. Y., experimental fish cultural station, hopes that his use of radio-isotopes in the study of metabolism in trout will help develop more efficient and economic methods of rearing fish in hatcheries.

Radio-isotopes are ordinary atoms of an element that has been made radioactive by subjection to the intense radiation present in a uranium reactor, or "atomic furnace." They may also be produced in a cyclotron, but in microscopic quantities and at great cost. The Oak Ridge, Tenn., uranium reactor produces radio-isotopes in relatively large quantities and at low cost.

Radio-isotopes are among the most promising of atomic energy's byproducts. Scientists have called them the most important research tool developed since the microscope, for they permit the course of atoms to be followed on a practical basis for the first time.

A radio-isotope of calcium, for example, behaves like ordinary calcium. But scientists can trace its tell-tale radiation with a Geiger counter, enabling them to follow it through the complicated chemical and biological processes of metabolism. (Metabolism is the group of processes in living organisms which build up assimilated food materials, and which release energy by breaking the materials down.)



Hearing on Increases of Express Ice Charges for Fish

The Interstate Commerce Commission announced on February 7 a hearing on March 29, 1949, at Chicago, Ill., on increases in the ice charges for fish and shellfish, filed by the Railway Express Agency in ICC-I & S No. 5612. (See Commercial Fisheries Review, December 1948, page 26.)



Wholesale and Retail Prices

The wholesale index for all commodities as of December 14, 1948, continued to drop and was 0.8 percent lower than November 16, 1948, and only fractionally higher than on December 16, 1947, according to the Bureau of Labor Statistics of the Department of Labor. In December, the rate of decline in foods was greater with the wholesale food index 2.8 percent lower than the previous month and 3.1 percent lower than on December 16, 1947.

The average wholesale price of canned pink salmon continued to decline during December 1948 and was 2.5 percent lower than the previous month, but still 14.4 percent higher than December 1947. Canned red salmon continued steady at the same average price which prevailed during September through November 1948, and was 5.9 percent higher than in December 1947.

On December 15, retail food prices, declining for the fifth consecutive month, were 1.2 percent below November 15, and 5.4 percent below the July peak. Food prices averaged lower in 45 of the 56 cities surveyed, higher in 10, and unchanged in 1. However, the fresh and frozen fish prices, in contrast to all foods, were

0.1 percent higher than a month ago, and still 3 percent higher than a year ago. Retail prices for canned pink salmon were 0.2 percent lower than November 15, but 19.2 percent higher than December 15, 1948.

Wholesale and Retail Prices

Item	Unit	Percentage change from-		
		Dec. 14, 1948	Nov. 16, 1948	Dec. 16, 1947
<u>Wholesale:</u> (1926 = 100)				
All commodities	Index No.	163.0	-0.8	+0.2
Foods	do	172.6	-2.8	-3.1
Fish:				
Canned salmon, Seattle:				
Pink, No. 1, Tall	\$ per doz. cans	5.664	-2.5	+14.4
Red, No. 1, Tall	do	6.649	0	+ 5.9
Cod, cured, large shore, Gloucester, Mass.	\$ per 100 lbs.	15.00	0	+ 3.4
<u>Retail:</u> (1935-39 = 100)				
All foods	Index No.	205.0	-1.2	-0.9
Fish:				
Fresh, frozen, and canned	do	328.1	0	+8.5
Fresh and frozen	do	268.5	+0.1	+3.0
Canned salmon:				
Pink	¢ per lb. can	61.1	-0.2	+19.2

~~WHOLESALE~~

DISTRIBUTION COSTS OF BRITISH FISH RETAILERS

The following table shows the apportionment of purchases, costs, and charges for fish on each \$400 of sales in England, and the decline of margins since 1945-46, according to the English periodical, Fish Trades Gazette, of November 13, 1948. They were compiled from accurate, audited figures, supplied by a small English firm operating less than a score of branches in the retail fish, game, and poultry trade. Doing a representative general trade, buying on an inland market and direct from coast, the figures are representative of the English medium-class retail fish trade.

Distribution Costs of Fish Retailers - Great Britain

On Each \$400 of Sales	1948-49			
	1/2 yr. to 9/25/48	1947-48	1946-47	1945-46
Paid to trawler owners, fishermen, coastal and inland wholesalers	78.1	77.9	74.1	72.7
Transport and market expenses to get goods into the shops from inland market and local stations	1.8	1.3	1.2	.9
Rents, rates, etc.	2.2	1.9	1.9	3.0
Staffs wages, National Insurance and Administrative expenses	14.0	12.3	12.3	10.5
Shop expenses: Light, heat, water, telephone, utensils, repairs, wrapping paper, offal clearance, etc.	1.6	1.5	1.5	1.2
Professional charges, audit, deprecia- tion, W.C.A. and third-party insurance	0.8	0.7	0.8	1.5
Taxation	1.5	2.4	5.3	8.2
Directors' fees		0.4	0.5	0.7
Shareholders (net)	?	1.0	1.1	1.3
Reserves for dilapidations, renewals, writing off war years' losses, etc. ..		0.6	1.3	
	100	100	100	100



FOREIGN

Bizone Germany

NETHERLANDS CLAIMS 20 FISHING VESSELS: The intention of the Dutch Government to have 20 German fishing vessels delivered to the Netherlands under the restitution proceedings has caused considerable unrest in German fishing circles, according to a December 15, 1948, report from the American Consulate at Bremen. According to the present stage of the discussions, the delivery of five steamers has finally been decided upon, while claims have been submitted for an additional 15 steamers.

Economic repercussions from the restitution of these 20 fishing vessels will be considerable. The steamers, which have a capacity of 90,000 baskets (110 pounds per basket), are, at present, operating and account for approximately 30 percent of total catches estimated at 250,000 metric tons annually. The steamers are the most modern of the German fishing fleet and average 540 gross registered tons each. It is stated that the German Executive Committee at Frankfort has requested that these restitutions be prevented.

SEVERAL FISHING VESSELS CEASE OPERATIONS DUE TO HIGH COSTS: Reports from the three big fishing ports, Bremerhaven, Cuxhaven, and Hamburg indicate that 20 fishing vessels of the German fishing fleet, totaling 170 vessels, were withdrawn from operations after the close of the herring fishing season, according to a December 20, 1948, report of the American Consulate at Bremen. The unusual increase in operation costs rendered impossible the operation of these vessels at a profit.

The decisive factor in operation costs was coal prices for fishing vessels. The price in August 1948 was 254 percent higher than in 1932. Railroad freight rates for coal were increased by 40 percent in August 1948 and landing charges for fishing vessels by 50 percent. This development tended to further increase the prices of other commodities, such as ice which went up 50 percent.

Hopes of the deep-sea fisheries that the currency reform would result in increasing performances and thus decrease the costs for repairs and new construction of fishing vessels were not realized. Costs are still three times as high as before. An increase in operation costs of 25 percent is now offset by an increase in the price for sea fish of but 12 percent. The margin of 13 percent has to be adjusted before withdrawn fishing vessels can resume operations and thus prevent an additional withdrawal of fishing vessels. This will require an increase in fish prices.



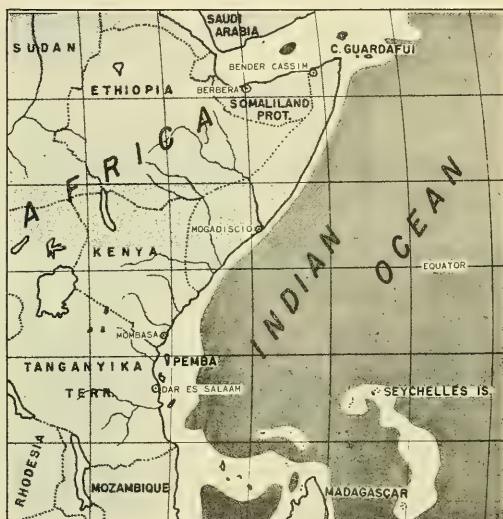
British East Africa

TRAWLING ATTEMPTED OFF EAST AFRICA: Present Venture: The first attempt at deep-sea trawling off the East African coast was made during November, according to November and December reports from the American Consulate at Mombasa, Kenya

Protectorate, based on articles in the Mombasa Times. A 265-ton trawler, Derna, from Hull, England, with refrigerated hold, has been procured to make the trawling tests. The trawler, owned by an East African company, is capable of operating nets at a depth of 250 fathoms; has storage space for 60 to 70 tons of fish; is fitted with the latest sounding instruments, which are necessary to a trawler operating in East African waters because of the danger to nets from coral; and has a crew composed of four Hull trawler men and Seychellois.

The undertaking is in the nature of an experiment. Intensive surveys will have to be carried out in order to discover the best fishing grounds, according to the company officials, but if the venture proves successful, the company can supply 50 metric tons of fish a week, and proposes to purchase one or two additional trawlers in order to supply both Kenya and Tanganyika with all the fish needed.

Until the new Government refrigeration plant is completed at Mombasa, the first fish brought in by the trawler will be packed in ice and distributed direct from the ship. The company also has purchased a 60-foot refrigerated sailing boat. In addition, the company is erecting a refrigeration plant at Dar-es-Salaam, where none exists at present; and later proposes to produce canned and dried fish for native consumption, fish meal and fertilizer, and shark liver oil.



Results of Two Trawling Trips: The Derna has, through November, made two trips from both of which she returned with fair catches and with gear intact. The skipper of the trawler reported that he discovered several areas which were quite free of coral, which disproves the theory until recently current that trawling would be impossible off this coast owing to the coraline nature of the sea bed.

The steam trawler, which sailed from Kilindini, November 15, for the first experimental trawling expedition with a skipper, 3 officers, and a crew of 18 Arabs and Africans, returned to port on November 20, 1948.

The catch was between 2,000 and 3,000 pounds of fish, caught off Malindi, and it includes two large specimens of the skate or ray species—both weighed about half a metric ton. According to the captain, the catch naturally did not compare with those in Northern waters, but with more experience, the catches should be good. A certain amount of difficulty with coral was experienced on this trip.

The second survey trip during the last week in November was far more successful than the first. Although some nets were damaged, a flat trawling ground was found. Its position has been carefully recorded on the trawler's charts, and as the surveys

proceed, it is thought likely that sufficient good fishing grounds will eventually be found to enable the trawler to work full time.

The vessel came into port December 3, with 8,000 to 10,000 pounds of fresh fish (mostly red mullet), cleaned and gutted. The iced fish was sold, straight from the trawler's hold, at 65 cents per pound—22½ cents per pound less than the last controlled price for cleaned, gutted fish.

The catch also included many strange species, which will be examined for identification.

The costs of running the trawler for these two trips were considerable, including the cost of crew's wages, food, fuel, port dues, etc. The vessel carried approximately \$244 of ice. The single-warp steel cable, 700 fathoms long, used for towing the trawl—cost approximately \$6,090. It is, therefore, likely to run at a loss for a very considerable period, until the crew has been properly trained, a complete series of surveys carried out, and the best fishing grounds charted.

Previous Experimental Fishing Expeditions: A South African businessman, who conducted experimental fishing off the coast for 14 months during 1946 and 1947 for a Capetown firm, states that a great future lies ahead of the deep-sea fishing industry off the East African coast. The possibilities of the coast, from Mombasa northwards as far as Bender Cassim north of Mogadiscio, were explored by this expedition. The chief object was to investigate the oil-bearing qualities of the sharks in these waters, and it was found that sharks did not exist in large quantities off the East African and Somaliland coasts.

During the same period, a second fishing expedition operated off the Seychelles Islands and reported that about 30 miles away to the south of the main island group was a bank, described as the Dogger Bank of the western Indian Ocean, which would provide a very rich fishing ground. Also, off the shore of Pamba Island were reported large shoals of a species of tunny for three months in every year. According to this expedition, tunny swim right up to the East Coast of Africa, sweeping inland about 200 miles north of Mogadiscio, go north round Cape Guardafui as far as Berbera, and then turn around and come back again. There is a canning factory in existence at Bender Cassim, operated by Italian interests. Before the last war, Sicilian fishermen made a regular trip, in season, following the tunny and taking their catch to the factory.

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DEVELOPMENT OF FISHERIES AND FISHERIES RESEARCH: East Africa Fisheries Research Organization: The three territorial Governments (Kenya, Uganda, and Tanganyika), with financial backing by the British Colonial Office, have planned various programs to develop the natural resources, including the fisheries, of British East Africa, according to several reports from the American Consulate General at Nairobi, Kenya.

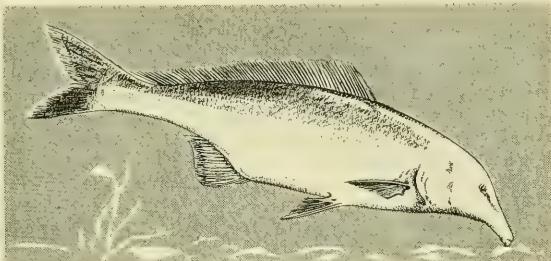
When the East Africa High Commission was formed in January, 1948, as an organ of Government, under which common legislation and common public services for Kenya, Uganda, and Tanganyika are centralized, it was announced that the various territorial research services also would be coordinated under the new administration.

The five fundamental branches of research for Kenya, Uganda, and Tanganyika, now amalgamated under the East Africa High Commission, cover the following subjects: Fisheries; Agriculture and Forestry; Animal Industry; Tsetse and Trypanosomiasis; Scientific and Industrial Research.

Fisheries Research Laboratory at Jinja, Uganda: The E.A.F.R.O., at present dealing only with lake and river research, has just completed its headquarters at Jinja in Uganda, according to its first progress report for April-August 1948. The immediate purpose of the Research Laboratory at Jinja is to carry out hydro-biological research on Lake Victoria, according to Dr. R. S. A. Beauchamp, Director of East African Fisheries Research. It is hoped that it will grow into a center for such research and that it will expand by forming additional sub-stations on other African lakes.

The building contains six laboratories, in addition to a library, common room, and general office. With a permanent staff of six, it is hoped that the laboratory also will have two or more visiting scientists for whom a fund exists to meet some of their expenses. The laboratory, equipped with all the essential apparatus for biological and hydrological research, possesses two motor launches as well as dinghies.

Preliminary Lake Victoria Survey: So far, the only work undertaken has been a preliminary survey of the Jinja area of Lake Victoria to discover the general distribution of the various species of fish and relate their occurrence to depth of water and the nature of the lake bottom, etc. Results of the survey have disclosed a relatively dense population of Mormyrus from 50 to 90 feet below the surface. The Mormyrus is a palatable fish which can be salted or smoked or used in the production of high grade fish meal. It may lead to the establishment of a large fishery in the deeper waters of the lake which, aside from providing a new un-tapped source of fish, would divert fishermen's attention from the popular Tilapia, at present in short supply.



MORMYRUS KANNUME. REACHES A TOTAL LENGTH OF 20 INCHES.
RANGE - FROM LOWER NILE RIVER TO LAKE VICTORIA.

Uganda's lakes and rivers, amounting to about 13,600 square miles of water or approximately 17 percent of the total land area, are largely undeveloped and are considered to be an enormous potential source of food and revenue. Exact estimates of present production cannot be given as the industry is almost entirely in the hands of natives, but, in 1946 it was reported that one corner of Lake Edward produces more than 3,000 metric tons annually worth, wholesale, nearly \$162,556; the northeast corner of Lake Albert produces fish to the value of nearly \$81,278 annually; Lake Victoria is said to produce a great deal more than \$203,195 annually; and there are innumerable smaller fisheries in lakes, swamps, and rivers which cannot be assessed. Despite this production, there are still large areas of potential fishing grounds unexploited, and native fishing and marketing methods are primitive and inefficient.

The first step considered essential to development of the industry was the establishment of an interterritorial research institute to study East African inland fish, their numbers, increase or decrease, their breeding and feeding grounds,

their seasonal movements, and their areas of greatest concentration. The second step was effective control of the Protectorate's fisheries in the form of a Fisheries Department to be set up at first under the Game Department heretofore in charge. This calls for a properly trained European fishery officer to be posted in each of the main fishery areas which were designated as Lake Albert, Lakes Edward and George together, Lake Kyoga, and Lake Victoria. He is to work in consultation with the Research Institute, trying out new fishery methods and carrying out their advice. The officer stationed at Lake Victoria is to be a direct employee of the Lake Victoria Fisheries Board.

Modernization of native fishing craft is considered imperative, although the process will be slow. The present type of primitive canoe and dugout cannot venture far from shore, and this has resulted in serious overfishing of inshore waters with complete neglect of the more distant waters. An improved type of fishing craft has already been introduced, and a boat-building industry with a subsidy for training craftsmen is contemplated. A net-making industry, utilizing local flax, is also under consideration.

The final phase of the industry to be reorganized is the marketing of fresh, dried, and smoked fish and fish products. The cooperative movement is being pushed in Uganda and it is believed that with European advice and supervision, cooperatives can be extended to the fishing industry. There should also be room for commercial organizations, possibly employed as Government agents on a profit-sharing basis, to buy and distribute fish. There is said to be a large demand in the Belgian Congo which could absorb the products of a greatly increased fishing industry in Lakes Albert and Edward, while the need and demand for fish proteins is almost universal in Uganda. A new Employment Ordinance compels employers to supply their labor with meat or fish which brings an increased demand for dried fish. Other possibilities contemplated for the future are dehydrating fish for export; canning the Ningu--a sardine-like fish beloved of the Africans; and production on a commercial basis of fish oil and fish meal.

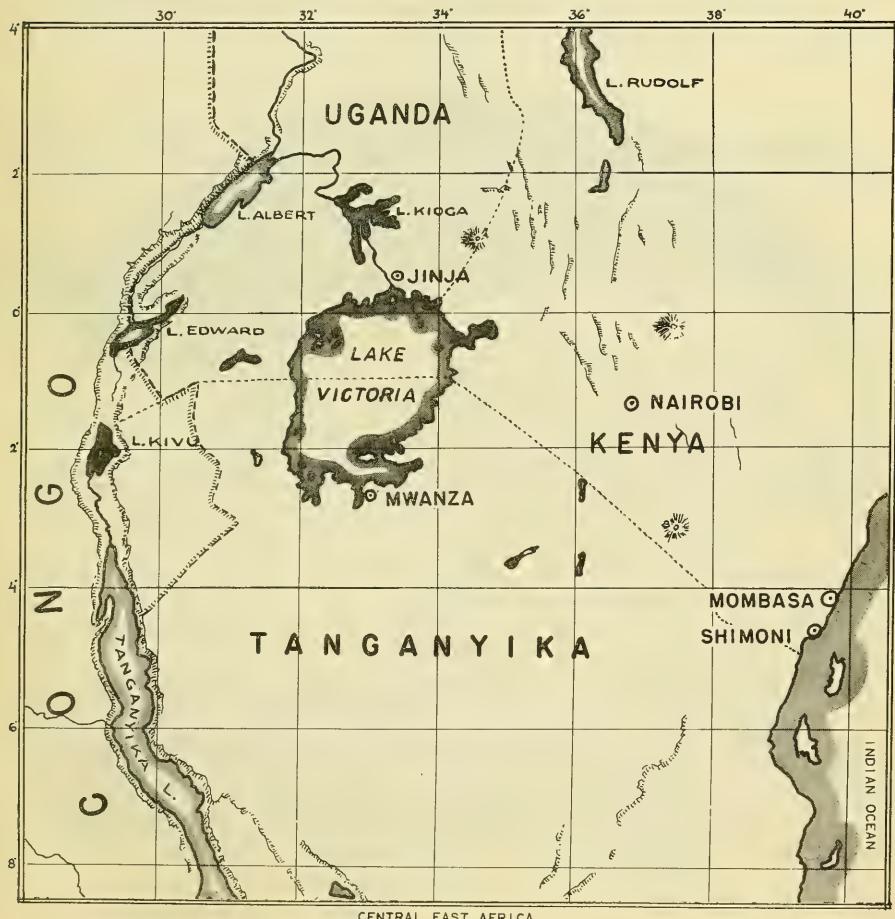
It is believed that effective organization of the marketing of fish and other lake produce will assure a steady long-term market and price to African fishermen. There will be no interference with the fishermen's activities, although advice and assistance will be offered in connection with such matters as marketing arrangements, and facilities for purchasing canoes.

In view of the steadily increasing demands for fish proteins, it is also believed that there is ample opportunity for an organized fish farming industry in ponds either built for water supplies or specially constructed for rearing fish. Efforts are being made to augment the fish population of Uganda's streams both by indigenous and imported stock. During the past few years, a large number of dams have been constructed. Many of these have been stocked with Tilapia, the local lake product which is one of the world's better edible fishes. They have also stocked the blue gill (Helioperca macrochira), well-known native of North America, but only in dams and streams which cannot overflow into the Nile system for fear that this highly reproductive fish will upset the balance.

Lake Victoria Fisheries Board: The Lake Victoria Fisheries Board, a separate organization which was promulgated in 1944, is an interterritorial department with headquarters at Mwanza, Tanganyika. The Board has little progress to report as it is still in the formative stage, but it is intended to deal with the practical aspects of developing the Lake Victoria fisheries.

Research Center on the Upper Sagana River: The River Research and Development Center on the upper Sagana River was financed by grants from the Kenya Government and the Colony's Development and Reconstruction Authority as one of the features of its Ten-Year Development Plan with the object of studying the ecology of Kenya rivers and to improve and, possibly, initiate new fisheries. Its dual functions—scientific river fishery research and practical fish breeding—will be administered by the Kenya Game Department. Its present staff consists of one biologist, one assistant fish warden, a hatchery superintendent, and two native technical assistants. The center comprises a laboratory, a trout hatchery and rearing station, an administrative center, and guest house accommodation.

The first object of the research program is to provide a scientific background for development of the Colony's trout, which are not indigenous to East Africa, but were introduced to Kenya some 40 years ago.



Research work is planned, also, in connection with the indigenous fish of the lower reaches of the rivers where native fisheries for Tilapia, Barbus, eels, catfish, and others exist, with the object of improving the yield of this food fish for the benefit of the African population. A fish culture farm is also planned for breeding indigenous fish as a new source of food.

The station, at present, has the only trout hatchery in East Africa and will serve the three British East African territories as well as neighboring countries, if desired. Liaison is to be maintained with the East African Fisheries Research Laboratory at Jinja, Uganda.

Future Developments in British East Africa: Other interesting events are taking place in British East Africa in connection with fish culture and research; plans for fish farming in Kenya; and the contemplated development of coastal fisheries and establishing a marine fishery research station on the coast at Shimonini.



British West Indies

IMPORT RESTRICTIONS RELAXED: A number of restrictions upon imports into the British West Indies were relaxed beginning January 1949, according to Trade News of the Canadian Department of Fisheries.

The new arrangements provide that additional dollar credits are to be put at the disposal of each of the West Indian Colonies (Bahamas, Barbados, Bermuda, British Guiana, British Honduras, Jamaica, Leeward and Windward Islands, and Ottawa) by the United Kingdom for increased purchases of a wide range of goods whose importation from hard currency areas has been hitherto prohibited or severely restricted on account of the dollar shortage. The new business will be in addition to what is already being permitted on a basis of need. Each importer will be free to purchase the goods of his choice from his preferred supplier up to the limit of additional dollars to be made available. The benefits of the new scheme will be extended to hard currency areas, including the United States. Most of the items covered by the new arrangements are goods presently banned and fish products are not listed among them (most fish products being allowed entry on a restricted basis) but local authorities will have discretion to add other items to the list.



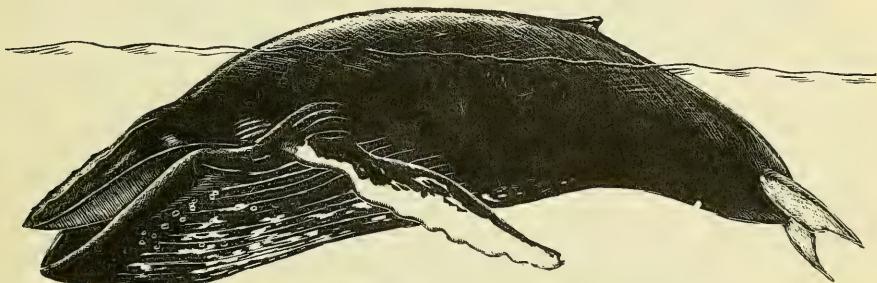
Canada

B. C. Canned Salmon Pack, 1948 (In Cases)		
Sockeye	-	260,050
Coho	-	193,587
Pink	-	321,514
Chum	-	496,928
Other	-	41,830
Total	-	1,303,909

BRITISH COLUMBIA CANNED SALMON PACK, 1948: The 1948 pack of canned salmon reached 1,303,909 cases, according to the final report of November 20 as reported by the Trade News of the Canadian Department of Fisheries. The pack of chum salmon in the last month was substantially higher than expected due to a heavy late run. The final totals for canned salmon by species are given in the table.

Although this is the smallest pack for several years, it will probably exceed in value all previous records. Average prices to the domestic market the latter part of 1948, f.o.b. Vancouver, for certified Grade A salmon, per case of '96 $\frac{1}{2}$ flats--(cases of 48 1-pound "talls" being \$1.50 less in each instance)--were reported to be: sockeye, \$33; coho, \$26; pink, \$18; and chum, \$16.50. These prices represent increases up to 10 percent above 1947 prices. A total pack value of about \$26,000,000 is indicated--assuming that pink and chum salmon are packed largely in "tall" tins. In value terms, the trend is definitely upward throughout. Although, relative to quantities, this trend becomes noticeable only after 1941--and was held in check under price control until 1946, indicating that in considerable part it is attributable to generally inflated price levels--it is probable that it is based fundamentally on continuing high production costs in the face of an increasing demand for this commodity.

BRITISH COLUMBIA WHALING OPERATIONS, 1948: The resumption of whaling operations on the Canadian West Coast in 1948 seems to have produced satisfactory results. Operations started on May 30, and the season closed on September 24, according to the December 1948 issue of the Canadian periodical, Trade News. A



MODEL OF A HUMPBACK WHALE IN THE AMERICAN MUSEUM OF NATURAL HISTORY

total of 184 whales were captured, which is higher than in 1942 and 1943 when whaling operations were concluded. The distribution by species of this year's landings was as follows: 116 humpback, 38 finback, 28 sperm, and 2 sei whales. The whales were processed at Coal Harbour on Quatsino Sound (northwest coast of Vancouver Island) and the capture was limited by the plant capacity.

An attempt was made this year to market small quantities of whale meat on the domestic market. The best type of whale for meat is the finback, with sei and humpback next in line, the sperm being undesirable for this use. The amount of meat available from the finback variety is up to eight tons per carcass.

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IMPORT RESTRICTIONS ON OYSTERS AND OTHER SHELLFISH LIFTED: Canadian import controls, which were imposed on November 17, 1947, in an effort to conserve the dwindling reserves of foreign exchange, were lightened on January 1, 1949, according to the Canadian periodical, Foreign Trade. Many foodstuffs and some manufactured items were removed from the list of prohibited products, while others (no fishery products included) were transferred to a quota basis. An improvement

Goods Suspended from Schedule I of the Emergency Exchange Conservation Act	
Tariff Item No.	Description
123a	Crabs, clams, or shrimp in sealed containers
124	
125	
126	
127	
128	
ex 123	Oysters
ex 133	
130	Turtles

in the balance of payments position between Canada and the United States rendered possible the lifting of trade barriers, which may be raised still further by the middle of next summer.

Oysters and other shell-fish were among those items on which import prohibitions were suspended on January 1.



Chile

EFFECTIVE DATE OF SOVEREIGNTY OVER CONTINENTAL SHELF LAW CHANGED: Legislation was passed suspending the validity of the "Codigo de Aguas" from its effective date, January 1, 1949, to September 17, 1949, according to a January 5 report from the American Embassy at Santiago. The Chilean Diario Oficial published the change on December 31, 1948. The "Codigo de Aguas" included the extending of Chile's sovereignty over the seas adjacent to its coasts to 31 miles offshore. The legislative act of August 18, which suspended the validity of the "Codigo de Aguas" from its original effective date, June 11, 1948, to January 1, 1949, also restored to legal effect certain provisions of the Civil and Minerals Codes which had been specifically modified by the "Codigo de Aguas," and provides that during the period of the suspension of this Decree, all laws, orders, regulations, and decrees relating to waters, which had been in effect up to June 11, 1948, shall continue in full force and effect. (See Commercial Fisheries Review, November 1948, page 51.)



Costa Rica

NEW FISHING LAW PASSED: The Costa Rican Government in the October 9, 1948, issue of La Gaceta published Decree No. 190, "Fishing and Marine Hunting Law." The purpose of this Decree is to place under State control the marine and hunting activities of Costa Rica which, in accordance with that Government's previous declaration, incorporates the submarine resources which Costa Rica's continental and insular shelf contain, as well as the zone of the seas adjacent to the continental and insular coasts of the Nation. (See Commercial Fisheries Review, October 1948, page 41.) This law also covers the fishing activities in the rivers and lakes of the Nation. The purpose of the law is to conserve the species through proper exploitation and to develop the fishing and marine hunting industries.

Certain of the articles of the Decree of interest to the United States fishing industry are quoted below in full and the others are summarized.

FISHING AND MARINE HUNTING LAW

Article 1 - Fishing affects a natural resource which forms part of the national riches, the regulation of which belongs to the Executive Power for which reason the present decree-law is issued in order to

determine the conditions of the right to exploit its resources, as well as to normalize its practice for the rational utilization, a greater economic yield and the conservation and protection of those species whose means of life is the water.

Article 2 - The practice of fishing or marine hunting in national, jurisdictional waters, or free seas by vessels of national registration; and commercial, industrial or sport fishing or hunting are included under this law.

Article 3 - Defines the classification of fishing under domestic for personal or family consumption, commercial fishing, sport fishing, and fishing for scientific purposes.

Article 4 - Fishing is hereby considered:

- (a) Any operation or action made for the purpose of catching fish, mollusks, crustaceans, and other species of water fauna and flora, for commercial, industrial, scientific and sporting purposes; and
- (b) The use of river beds, bottoms, waters, shores, beaches, coasts, and ports for the breeding, reproduction and dispersion of the same.

Article 5 - It is hereby considered that marine hunting is the capture of cetaceae, pinnipedia, and water birds, as well as the exploitation of the breeding places.

Article 6 - The Executive Power is authorized to establish through the medium of the Ministry of Agriculture and Industries:

- (a) The procedure and requisites necessary for the practice of maritime fishing and hunting;
- (b) To fix the seasons governing maritime fishing and hunting, either permanent or temporary, general or regional, reserves and other conditions guaranteeing methodical and rational exploitation from biological, sanitary, commercial, industrial and sporting viewpoints;
- (c) To regulate the manner of fishing to be employed and its characteristics; and
- (d) To draft the sanitary regulations and other rules necessary to adopt for the regulation of aquiculture, traffic, transport, internal trade, exportation and importation of products from fishing or marine hunting whether it may be in places or localities where it is concentrated, in private establishments or floating factory vessels.

Article 7 - Fishing and marine hunting in seas protected and controlled by the State may be practiced only by vessels, floating factories or installations under national registration, or by vessels of foreign registration providing they have permission duly granted by the Ministry of Agriculture and Industries.

Article 8 - Any company or person, physical or juridical, dedicated to fishing or marine hunting or to the industrialization, transport, conservation or trade of such products must be registered in the Register carried by the Ministry of Agriculture and Industries.

The registrants shall be obliged:

- (a) To carry and exhibit the books and documents required by the respective regulations;
- (b) To submit the information required by the competent authorities;
- (c) To aid at any time and place the authorized officials in the fulfilment of their duties of control; and
- (d) To obtain a permit for the carrying out of their activities which will be issued, when within the law, by the Ministry of Agriculture and Industries.

Article 9 - The authorization for fishing and marine hunting may be granted by the Ministry of Industries after publication of a contract in La Gaceta one month before its enforcement in order to hear any objections on the part of third parties, when it is for a period of less than five years. When it is for periods of more than five years, approval of Congress is necessary. The registrants cannot transfer their permissions without previous authorization from the Ministry of Industries and they will be subject to the jurisdiction of the Costa Rican courts.

Article 10- The right to fish must be exercised without obstructing navigation, the natural course of the waters and the utilization of same, when permission has been given by the Executive Power or Congress, and without prejudice to the rights of third parties legitimately acquired, or unless prohibited for security or police reasons.

Article 11- Defines practice of fishing in waters on private property.

Article 12- The permissions or concessions may be revoked, without indemnification, because of the nonfulfilment of this law and its regulations, without prejudice to any of the responsibilities which are incurred by the registrants or grantees.

Article 13- The use is prohibited of traps, appliances, fishing apparatus and machinery which have not been approved by the Ministry of Agriculture and Industries. The use of explosives, chemical or poisonous products is prohibited as a means for obtaining species of aquatic flora and fauna as well as any other procedure declared harmful. Also construction or placing of dispositives impeding the passage of fish in water, lakes and lagoons of public service, or on the private properties communicating therewith is prohibited. The construction of docks and dikes in such waters will be subject to the regulation upon fish ladders as dictated by the Ministry of Agriculture and Industries.

Article 14- Importation and exportation of fish eggs and living marine species permitted when authorized by the Ministry of Agriculture.

Article 15- Oyster beds declared national reserve and the Ministry of Agriculture and Industries may grant permits or concessions for their exploitation.

Article 16- The fishing for exportation which is effected by vessels of foreign registration, with the authorization of the Ministry of Agriculture and Industries and whose fresh products are exclusively destined for foreign markets will be subject to the provisions of the present law and its regulations, as well as to the pertinent provisions that may be made in the future.

- (a) The mother ships or floating plants must always be situated in the bay and within sight of national wharves.
- (b) Fishing within the limits of territorial waters where the product is not brought to established plants in the national territory, will be considered as exportation subject to customhouse taxes and other surcharges, in conformity with the respective tariff; and
- (c) Mother boats, factory boats or any other boats, in order to sell or transfer merchandise proceeding from their stores or commissaries, should provide themselves with the municipal patent corresponding to the jurisdiction in which they may be and also must pay the importation fees according to the respective tariff upon all and any classes of merchandise which may be unloaded from them.

Article 17- All registrants or concessionaires must render warranty to the satisfaction of the Executive Power guaranteeing the fulfilment of their contracted obligations, as well as to guarantee the responsibilities which they may incur.

Article 18- The registrants to which article 16 refers must obtain for each trip and for each shipment a permit called "Via la Pesca" ("For Fishing Purposes") the duration and conditions of which are established by the regulation of this law.

Article 19- The Ministry of Agriculture and Industries is authorized to develop for the account of the state and for social purposes or public utility, the fluvial and marine fishing and hunting, or also in association, with private individuals, whether they be national or foreign, in a total or partial manner.

Article 20- The Ministry of Agriculture and Industries will determine:

- (a) The fee for the special use of public domain for activities connected with fishing;
- (b) The lease of sites, instruments or useful implements to be used in such activities;
- (c) The fees and contributions of registration, of analysis, and of inspection required for the fulfilment of this law;
- (d) That which must be paid by registrants or concessionaires of fishing and marine hunting, as well what must be paid by those who have made exploitations without the authorization of the Executive Power or for violations of these regulations;
- (e) The tariffs which regulate the sale of eggs, fish, aquatic plants and any other product of marine fishing and hunting obtained or processed in the establishment of the fisheries department of the Ministry of Agriculture and Industries; and
- (f) The fees for the exploitation of natural or artificial media referred to in this law.

Article 21- Any lack of declarations, act or omission in connection with payment of taxes, fees, contributions and other resources mentioned in the previous article shall be punished with a fine up to ten times the amount which was left unpaid or for which an attempt was made to elude payment. The collection of the fiscal credits in connection with the above stipulations will be effected through judicial process.

Article 22- Authorizes Executive Power to free from import duties vessels, vessel machinery, appliances, transport and industrialization machinery, and scientific material destined exclusively for marine fishing and hunting if such exemption will not affect those industries whose welfare is considered of national interest.

Article 23- Promoting sport fishing.

Article 24- The Executive Power will entrust the Consuls of the terminal ports of the vessels proceeding from Costa Rican waters, to verify that said vessels have observed the provisions of this law and its regulations. Said Consuls may issue permits for sports fishing, to the persons who wish to fish in national waters, according to the terms of the regulations, it being optional for the captains of those vessels to call at Costa Rican ports.

Article 25- The Executive Power is authorized to construct and develop central markets and refrigerated storage regulating the use of their services and the commercialization of the products of marine fishing and hunting.

Article 26- The official credit institutions of the State shall regulate the issuance of credit to the fishing industry making it adequate to the needs of the producers, the terms of amortization, and also the issuance of credit for the activities of conservation, elaboration and transportation of their products.

Article 27- Catching only the species permitted during legal open season and observing legal size limits; to return the permit "Via la Pesca" within the time limit; to return to the water the species caught which are not desirable providing that they are alive; to provide necessary documents for fishery products which are being transported; to register prior to their use, the fishing implements and the foreign vessels which are going to be used; to keep a registry book in which catches and exportations are noted; and other limitations and provisions.

Article 28- Lists certain acts which are prohibited among which are the use of drag nets in waters where there are sedentary species; and the installation of fishing machinery without the authorization of the Ministry of Agriculture and Industries.

Article 29- Lists certain acts prohibited for third parties among which are the transportation or shipment of fish products without the legal documents required.

Article 30- Infractions of any part of this law will be punished by fine or imprisonment, and the confiscation of the fishing products, vessels and equipment.

Article 31- All the laws and regulations which may have been dictated in relation to fishing and marine hunting are derogated.

Transitory 1 - The existing permits for marine hunting and fishing must, to maintain their validity, be adjusted to the dispositions of the present law and its regulations, within the time which may be fixed by the Executive Power.

Transitory 2 - While there is no Congress, the authorization for periods of more than five years, to which article 9 of the present law refers, will require the approval of the Founding Junta of the Second Republic.

Iceland

PRESENT BUDGET DIFFICULTIES DUE TO POOR FISHING: On November 5, 1948, the highest budget bill ever to be introduced in Icelandic history was presented to the Althing by the Icelandic Minister of Finance.

In his budget speech, the Minister attributed the present status of the budgetary situation to poor fishing (poor herring fishing during the past four years) and to the increasing tempo of inflationary pressures. In order to assist the motor boat fleet operators financially, because of the losses incurred due to the unfavorable summer herring catch, the Government will grant loans out of a \$1,000,000 appropriation appearing in the proposed 1949 budget.

AIDS FISHING INDUSTRY FINANCIALLY: The latter part of December 1948, the Althing passed a law providing financial assistance to the fishing industry and establishing new methods of revenue to obtain the necessary funds, according to a December 31, 1948, report from the American Legation at Reykjavik. The emergency measure, to become effective on January 1, is designed particularly to support those fishing trades which have been adversely affected during 1948: quick-freezing plants, curers of salt fish, and the motor boat fleet which fishes for herring and supplies the quick-freezing plants with whitefish.

The Government will continue its guaranteed price on exports of frozen and salted fish but reserves the right to determine when and to which countries of destination they shall apply.

The program will be financed by a "Government Inflation Fund" established by revenue from customs, direct taxation, and various provisions of the 1949 Budget. Estimates of the total cost of the plan run as high as \$10,787,000.

AGREEMENT CONCLUDED WITH BRITISH TO SELL FISH TO BIZONE GERMANY: An Agreement was concluded on or about December 16, 1948, in London between the Icelandic and British Governments, concerning the sale of iced fish to Bizon Germany, according to a December 21 report from the American Legation at Reykjavik. The Agreement calls for the delivery of 67,000 tons of iced fish between February 1 and October 31, 1949. The price is approximately \$157 per metric ton (C.I.F. German port) heads off and gutted and about \$121 per metric ton with heads on. The contract calls for the delivery of redfish and catfish with heads on. In addition, under the Agreement, the Icelanders will be able to sell 10,000 tons of iced herring.

Under an Agreement signed on April 20, 1948, between the Icelandic and British Governments, the Icelandic trawlers delivered up until December 15, 1948, to German ports 60,130 metric tons of iced fish, consisting of cod, redfish, catfish, and coalfish (pollock). In addition, 2,936 metric tons of iced herring were sold. The Agreement called for the delivery of iced fish until October 31, 1948, provided there were no fish shortages in Great Britain. Permission was granted to Icelandic trawlers to land cargoes of iced fish at German ports until December 31, 1948. In 1946, only 464 tons of iced herring were sold to Bizon Germany.

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ICELANDIC MOTION FOR PATROL AND EXTENSION OF TERRITORIAL WATERS: A motion for a resolution regarding territorial waters patrol and extension of the territorial waters of Iceland was introduced before the Joint Althing on November 23, 1948, according to Icelandic press reports.

The resolution calls upon the Icelandic Government to prepare and introduce in the Althing a bill regarding a territorial waters patrol. The bill is to include that the administration and supervision of the territorial waters patrol be handled by a special department of the Ministry of Justice, including control of fisheries and supervision of the equipment and actions of foreign vessels, especially in fjords and ports; that a sufficiently large and modern fleet of patrol boats with planes and other equipment for the patrol activities of the territorial waters be provided; and patrol of the territorial waters be coordinated, as closely as possible, with life saving activities, control of fisheries, ocean researches and oceanography.



In addition, the resolution urges the Government to enforce vigorously the legislation passed by the last session of the Althing (1947) which authorizes the Government to specify areas of protection at any point of the Icelandic coast within the confine of the coastal shelf and to establish regulations concerning their utilization; and to seek recognition through the United Nations of the historic and legal right of the Icelanders to extend their territorial waters to four nautical miles and that all fjords and bays be considered part of the territorial waters.

* * * * *

NEW FLOATING FISH FACTORY IN OPERATION: The arrival in Iceland from Portland, Oregon, of the 6,900-ton floating fish factory, The Haeringur, purchased under ECA's \$2,300,000 loan to Iceland, was reported by the Economic Cooperation Administration on December 21.

This largest and newest addition to Iceland's fishing fleet has been outfitted with additional equipment in the Reykjavik harbor and has already gone into operation. It will sail from harbor to harbor on the southern coast of Iceland this winter to receive and process aboard the fish brought in by fishing trawlers into herring meal and oil. The dried herring meal is used for animal fodder in many European countries and is frequently used as fertilizer, while herring oil is used in the making of margarine.

By the addition of the floating fish factory to the fleet, it will be no longer necessary for Icelandic merchants to charter vessels to haul the fish from winter fishing grounds in the southwest to the herring oil and meal factories on the north coast. Formerly, the big herring season during the winter was on the north coast, but in recent years, the herring run has shifted to the south, thus creating the problem of hauling the fish to the northern plants.

The vessel, a former freighter, was purchased in Portland for \$192,500. The over-all cost of special equipment obtained from many sources was \$433,000.

The loan to Iceland will be used also to finance the purchase of additional fish processing equipment and large amounts of fishing net to replace the nets lost in a large fire in Iceland last winter.

The herring processed aboard the former American freighter is expected to stimulate Iceland's productivity and, consequently, the export of one of her most important commodities to other European countries.



Japan

FISHERY PRODUCTS AVAILABLE FOR EXPORT: Commodities available for export from Japan are listed in Appendix A of an International Reference Service Report, Doing Business with Occupied Japan, issued by the Office of International Trade, Department of Commerce. (See page 78 of this issue for review.)

Among the commodities, the following fishery products were listed as available for export:

Drugs and Health Supplies

Agar-agar	Vitamin A oil
Fish livers, frozen	Vitamin D oil
Sperm head oil	

Food and Agricultural Products

Canned Foods:	Frozen Foods:
Boiled mackerel	Abalone
Boiled sardines	Albacore
Boiled scallops	Baby clams
Clams, baby	Cuttlefish
Clams (Hokki)	Frog legs and rounds
Crabmeat	Octopus
Eels	Oysters
Pepper sardines	Red snapper
Pink salmon	Scallops
Sardines in oil	Swordfish
Smoked oysters in oil	Tuna
Smoked yellowtail in oil	Seed oysters (available November to March)
Tuna in oil	

Food and Agricultural Products (Cont.)	
Dried Foods:	Dried Foods (Cont.):
Abalone	Oysters
Bonito (Katsubushi)	Seaweeds (Nori)
Cuttlefish	Shark fins
Herring roe	Shrimp

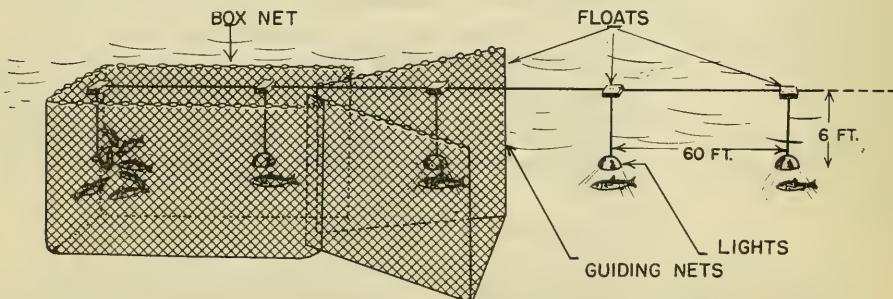
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AUTHORIZED FISHING AND WHALING AREA: A memorandum to the Japanese Government on authorized areas for Japanese fishing and whaling, amends and makes two minor changes to SCAPIN 1033, June 22, 1946. The changes provide a more exact delineation of the authorized areas east of Nemuro Peninsula, Hokkaido, in the vicinity of the starting point of the authorized area boundary line, but do not involve any increase or decrease in the authorized area, according to the December 25 Weekly Summary of SCAP. (See Commercial Fisheries Review, November 1948, page 54.)

USE OF LIGHTS IN CATCHING FISH: Use of electric lights for increasing the catch of fixed net fisheries was demonstrated under actual fishing conditions during the summer of 1948 off Cape Uomi, near Atami, Shizuoka Prefecture, according to the December 11 Weekly Summary of SCAP. These experiments indicated that the catch could be increased 20-30 percent with a substantial saving in the amount and cost of gear.

Knowing that fish gather around a light, a member of the Nishima Laboratory of the Physical and Chemical Research Institute, began experimenting in 1945 with lights to lure fish into nets. These experiments were conducted first in Lake Hamana to develop techniques and later applied to full-scale commercial fishing operations off Atami.

The method consists of using lights, similar to the headlight of an automobile, with bulbs of 150 watts and a reflector. Twenty of these lights are placed at a depth of 2 meters in a single row. They are spaced 20 meters apart and begin from a point about 300 meters offshore, or at the inshore end of the leader of a fixed net. The first 19 lights are so hung that the beams of light shine down toward the sea bottom. The 20th, or the end light of the row, located in the pocket of the net, casts its beam horizontally toward the row of lights extending from offshore. At dusk, the lights are switched on by a cable connected with a land-based power unit. The lights burst into brilliance through the water, illuminating about 400 meters in a straight line. Fish are attracted toward these lights. Then,

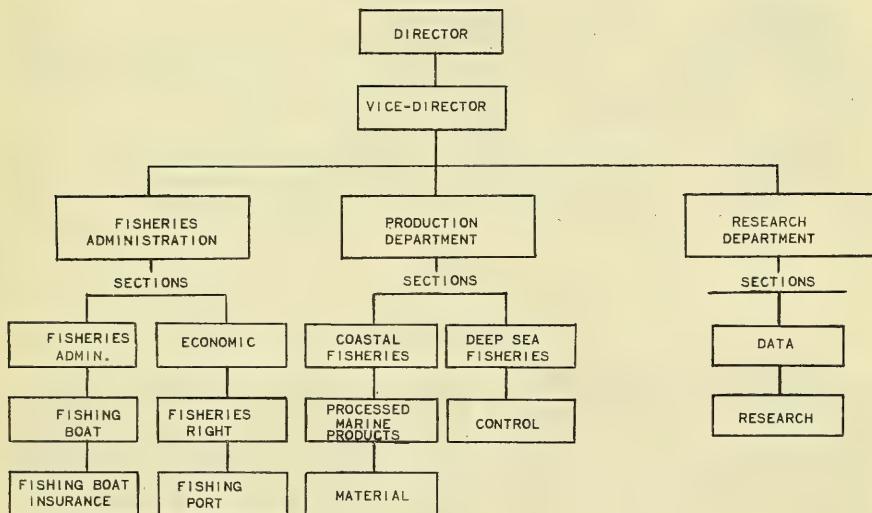


the lights are turned off successively at 5-minute intervals, beginning with the first light. Fish congregated under a light tend to move to the next light when the light above them is switched off. In this manner, the fish are lured along the string of lights to the funnel-shaped guiding nets and into the pocket of the box net where they are trapped. The operation is repeated twice during the night. Results on a moonless night are better than those on a moonlight night.

Although the use of lights for this type of fishing is still in an experimental stage, recent trials have impressed some fishermen with the practicability of the method. The experiments are supported by the Fisheries Agency, Ministry of Agriculture and Forestry, and also by the Ministry of Education. The average daily catch by this method, in an experimental period May 3-June 20, was 600 pounds in each net as compared with 306 pounds using the ordinary type of gear.

ORGANIZATION OF THE FISHERIES AGENCY: The organization of the Fisheries Agency, Ministry of Agriculture and Forestry, is shown in the chart.

ORGANIZATION OF JAPANESE FISHERIES AGENCY - JULY 1, 1948



The chart lists departmental and section chiefs with their corresponding dates of appointment. In some instances, the section chiefs held the same positions in the Bureau of Fisheries before the establishment of the Fisheries Agency on July 1, 1948.

SHIP CONSTRUCTION POLICY: A letter from the Fishing Boat Section, Fisheries Agency, to governors of prefectures, subject, "Construction Plan of Fishing Boats" explains the Japanese policy governing ship construction, the principal features of which are:

No construction will be approved by Fisheries Agency on new fishing boats except as replacements for old, worn-out, or sunken vessels,

either steel or wooden, of such categories as those for which official authorization is required by Supreme Commander for the Allied Powers or by the Japanese Government.

Construction of a substitute vessel will be authorized only within the limit of the gross tonnage of the vessel which is being replaced.

The old vessel shall either be scrapped or converted for purposes other than fishing except in some cases where conversion to fish carriers can be made.

This policy has been established to prevent further expansion of the Japanese fishing fleet which has now reached the prewar level of 1939 and which is considered adequate to maintain the present level of production within the authorized fishing area.



Liberia

FISH AVAILABLE IN LIMITED QUANTITIES: Meat, fish, and wild game are not obtained in sufficient quantity to offset the protein deficiency found in the Liberia diet, according to a December 13 report from the U. S. Economic Mission at Monrovia. In the coastal belt, fish is available in limited quantities about six months of the year. In the hinterland, little, if any, fish is obtainable.

Fish Imports: Imports of foreign foods for the first 11-month period of 1948 amounted to better than a million dollars. Products consisted mostly of milk, smoked and dried fish, butter, corned beef, flour, rice, sugar, and beverages. The United States of America received the major share of this trade.



Malay States

FISHERIES, 1947: Fisheries Rehabilitated: The annual report of the Fisheries Department of the Federation of Malaya and Singapore for the year 1947 indicates that by the end of that year, Malaya's fisheries were considered to have completed rehabilitation and to be in normal operation as far as fishing boats and their particular equipment and other fishing gear were concerned, according to the Canadian periodical, Foreign Trade, of January 8. The industry gave employment to 44,379 individuals during 1947, some 75 percent of whom were Malays, the others being Chinese. There were 16,215 fishing boats in use, 114 of which were motor driven, the balance being operated by sail or manpower. The bulk of salt-water fishing operations were based on the use of fishing stakes, seine nets, and drift nets. These three types of gear represented some 60 percent of all larger fishing operations.

The wide distribution of fishing activities in Malaya, as well as several other factors, make it difficult to form any accurate estimate of the industry's production. The Department of Fisheries, however, states that output in 1947 reached a minimum of 42,000 metric tons, made up almost entirely of salt-water landings.

Both coastal and inland fisheries supply a number of excellent varieties which are as much appreciated by the European population as by the Malays, Chinese, and Indians, to all of whom such food is a staple article of diet. Current labor costs, as well as those of equipment, and the general level of prices of domestic produce force the price of several varieties of locally-caught fresh fish above those of salmon, halibut, and other types of cold-water fish imported from Canada, the United Kingdom, and Australia.

As in most other eastern countries, Malaya's fisheries operate, for the most part, with primitive equipment and a general lack of cold-storage facilities which act, to some extent, as a limitation on the trade in fresh fish and a concentration on tinned varieties. The cost of the fresh product is also increased by the shortage of refrigerated storage space.

Imports of Fishery Products: Singapore is an important market for a wide variety of fish and fish products, both for consumption throughout Malaya and for re-export to adjacent territories. There is a limited volume of business in fish at other Malayan ports such as Penang, Port Dickson, Port Swettenham, and Malacca, but Singapore is predominant in Malaya's import and export trade in all

these products (Table 1), according to the January 8 Canadian periodical, Foreign Trade.

Table 1 - Malayan Imports of Fish

	Metric Tons	
Fish, dried and salted	14,375	\$ 5,382,034
Fish, fresh	9,306	4,857,570
Miscellaneous canned fish ..	3,246	1,909,710
Sharks' fins	267	398,057
Canned sardines	102	88,992
Fish maws	17	34,985
Canned salmon	7	5,413
Total	27,820	\$12,676,761

Canada, Hong Kong, and Australia. The trade in miscellaneous canned fish comprised, for the most part, imports from Mexico, Canada, and India. Sharks' fins are purchased mainly from India, various South Pacific Islands, and Ceylon. The canned sardines originated mainly in Canada. Fish maws were brought in mainly from Indonesia and India. The limited business in canned salmon was almost entirely of Canadian origin.

Additional imports of fishery products during 1947 were \$1,663 worth of whale and fish oils, mainly from Siam and Norway, and 11,617 metric tons of fish valued at \$965,994 for use as fertilizer. This trade was made up almost entirely of supplies from Indonesia.



Precise details of import control policies to be administered by the Singapore and Malayan governments during the coming year are not available. With mounting evidence of a strenuous dollar-conserving policy and some improvement in the availability of supplies from South Africa and other sterling areas, there is little prospect of the business being continued except on a greatly restricted scale.

Outlook for Imports: With a reversion to normal trading conditions, it can be assumed that imports of fresh and smoked fillets, salmon, halibut, and other similar types will be resumed on a somewhat larger scale than in prewar years or at the present time. The business should extend to well over 100 metric tons per year. The trade in dried or salted varieties has never been large, but there is a reasonable prospect that business in dry salt herring might be developed in Singapore as a supplement to the existing trade in Hong Kong and Shanghai. The product, however, is not well known in the local market.

In the case of canned fish, the trade will probably revert to its prewar composition, but with some increase in the value of shipments of canned herring.

The outlook for business in oils and other miscellaneous fishery products is likely to be very restricted, owing to weak demand.

Exports of Fishery Products: Exports of fishery products during 1947 illustrate the importance of Singapore and other Malayan ports in Southeast Asia's trade in these goods. Exports of dried and salted fish reached a value of \$2,183,753, the bulk of such shipments going to Java and Sumatra. Miscellaneous canned fish shipments, destined principally for Sumatra, Dutch Borneo, and Sarawak, were worth \$379,115. Exports of fish maws, obviously of Malayan origin, were valued at \$214,232 and were made mainly to the United Kingdom. Including smaller values for sharks' fins, canned salmon and sardines, and fresh fish, the total value of such exports reached a total of \$2,985,059.



Mexico

NEW SEVERANCE TAX LAW ON CERTAIN FISHERY PRODUCTS: The Mexican Diario Oficial of December 30, 1948, carried a new severance tax law for certain species of fishery products taken in territorial waters of Mexico, which entered into effect on January 1, 1949, according to the United States Fishery Mission to Mexico. This new law places a severance tax of 20 centavos a kilogram (or 5 cents U. S. per kilogram when the tax is collected by Mexican fishery offices in the United States) on the following fishery products taken within the territorial waters of Mexico:

Abalone	Lobster
Clams	Crawfish
Cabrililla (kelp bass and rock bass)	Millet
Shrimp	Oysters
Squid	Octopus
Curbina (white sea bass, spotted trout, and corbina)	Robalo (Gulf pike or snook) Totoaba (Mexican sea bass)

All of these species are in part or in their entirety reserved for cooperative fishermen. This new law specifies that the cooperatives must pay the tax at the time of original sale of the products. Fifty percent of the tax will be used for establishing a reserve fund in the Cooperative Development Bank (Banco de Fomento Cooperativo) for the purchase of fishing boats, gear, and equipment for the fishing cooperatives.

This law is actually a revision of the Decree of October 20, 1942, published in the Diario Oficial of November 24, 1942, and amended by Decree of January 5, 1943.^{1/} This latter Decree, which imposed a tax of one peso per kilogram on the above-listed fishery products (with the exception of mullet and robalo, which are new to the list) is abolished by the present law.

The present tax does not supplant already existing severance taxes but is an additional tax to those specified in the Tariff Act of January 20, 1933.^{2/}

The present law makes no exceptions and its effect will probably be rather far-reaching. For example, the shrimp fishery in the vicinity of Ciudad del Carmen, Campeche, will be obligated to pay this tax, as also will the fishermen in Laguna Madre, Tamaulipas, who take curbina (spotted trout) for export to the United States. Likewise, the shrimp fishery in the Gulf of California, as well as the lobster, abalone and totoaba fisheries, will be required to pay the new tax, whereas previously they were exempt from it. Most of the shrimp, abalone, clams, cabrilla, curbina, lobster, and totoaba taken in Mexico, are exported to the United States and it is expected that the new tax will cause a rise in the price of these products.

From the present law, it is impossible to determine whether American boats operating in Mexican waters under "via La Pesca" permits will be exempt from this tax. It may be that fishing boats from San Diego and Los Angeles, Calif., which take cabrilla and curbina in Mexican waters will be affected.

"VIA LA PESCA" PERMIT FEES FOR MEXICAN EAST COAST:^{3/} The Diario Oficial of December 14, 1948, carried a Decree which makes the "via La Pesca" fees for the east coast of Mexico identical to those of the west coast.

The establishment of such fees for the east coast of Mexico has no immediate significance for United States fishermen since no American boats are now fishing along the east coast of Mexico under "via La Pesca" permits.

The fees for the west coast made applicable to the east coast by the present Decree were increased 40 percent by the Decree published in the Diario Oficial of August 30, 1948.

The scale of fees promulgated August 30, 1948, is as follows (based on the storage capacity of the boat, per net ton):

	For Boats using		
	Nets	Bait	(Pesos per net ton) ^{4/}
a. Up to two tons	-	-	\$ 43.75
b. More than 2 but not exceeding 3 tons	-	\$105.00	105.00
c. More than 3 but not exceeding 15 tons	-	113.75	113.75
d. More than 15 but not exceeding 120 tons	-	87.50	70.00
e. Over 120 tons: from February 20 to November 15 of the same year	-	87.50	70.00
From November 16 of one year to February 19 of the following year	-	43.75	43.75
The basis shall be the time at which the fishing trip is to be made, "rather than the date of issuance of the clearance.			

^{1/}"Mexican Fishery Legislation," Fishery Leaflet 260, Appendix XXIV, page 79, Fish and Wildlife Service.

^{2/}Fishery Leaflet 260, Appendix IV, page 44.

^{3/}See Commercial Fisheries Review, November 1948, p. 59, and December 1948, p. 42.

^{4/}One Mexican peso equals approximately \$0.1454 U. S.

Netherlands

SUPPLIES HERRING TO RUSSIA AND BIZONE GERMANY: Negotiations are going on between the Netherlands Government and the USSR for the sending of 26,500 barrels of salted herring to the Russian zone of Germany, according to a December 13 report from the American Embassy at The Hague, Netherlands. Negotiations are also under way for 75,000 barrels of salted herring from Holland to be sent to the British and American zones in Germany. The first part of December, a contract was signed for the early delivery of 6.6 million pounds of fresh herring for the British and American zones of Germany.

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WHALING INDUSTRY, 1947-48: The production of whale oil and byproducts from the 1947-48 catch of ships operated in the Antarctic by the only whaling company in the Netherlands follows:

Whale oil - 13,033 metric tons	Whale meat - 69 metric tons
Sperm oil - 1,176 metric tons	Livers - 373 barrels

The sale of oil, meat, liver, and byproducts brought \$5,517,980 compared with \$4,692,240 for the previous season, according to a December 24, 1948, report from the American Consulate General at Amsterdam.

The Netherlands Government had contracted, in advance, to purchase the entire whale oil output of 13,033 metric tons at \$756.20 per ton. The oil will be used in the production of margarine.

Chemical works purchased the bulk of the sperm oil for use in the manufacture of cosmetics.

A Netherlands firm processed and canned the 69 tons of meat, which, it is reported, found ready buyers since the supply of meat for domestic consumption is considerably below demand.

The season's catch was not as large as had been expected, partly on account of unfavorable weather conditions, but the 1947-48 production of whale and sperm oil exceeded the previous season's by 1,815 metric tons. At present, the production of this one company covers only half of this country's requirements.

Fleet: During the 1947-48 season, the factory whaler, Willem Barendsz, proved capable of handling more whale units than the eight accompanying whalers could provide. Therefore, it was decided to expand the fleet and two British corvettes were purchased. These two ships, with a speed of 16 to 17 knots, were converted in time to join the third expedition which arrived in the Antarctic recently.

The Netherlands whaling company has announced that it intends to replace several of the smaller and older whalers. The company has, therefore, purchased from the Netherlands Government three Japanese whalers which were found in Indonesia at the end of the war and are regarded as war booty. The three Japanese whalers, built in 1937, 1938, and 1940, will equal the company's best whalers. The company also hopes to complete the repairs in time for the whalers to join the 1949-50 expedition.

Outlook for 1948-49 Season: Prospects for the coming season, which started on December 15, 1948, are good. Considering especially the addition of two whalers

and the improvements in the factory whaler, the one company feels confident that the 1948-49 expedition will return with a fair share of the maximum 16,000 blue whale units which may be caught by all expeditions in the Antarctic under the International Convention for the Regulation of Whaling. The Netherlands Government has again contracted for the entire whale oil output at a price of \$385.70 per ton for first quality oil.



Newfoundland

UNION WITH CANADA SET FOR MARCH 31, 1949: The signing of the terms of agreement for union of Newfoundland with Canada took place at noon on Saturday, December 11, in the Senate Chamber of the Canadian House of Parliament on Capitol Hill, Ottawa. Canadian Government policy and temporary administrative arrangements concerning Newfoundland are set forth in a memorandum issued also on December 11, 1948, but not included in the Terms of Union, according to the Fisheries Council of Canada and the December 18 issue of the Canadian periodical, Foreign Trade.

The following are some of the highlights of the Terms of Union and the accompanying memorandum in respect to the fisheries:

Fisheries (Marketing) Board to be a Federal Agency: (1) The present Newfoundland laws relating to export marketings of salted fish will be administered by the Newfoundland Fisheries Board operating as a federal agency under the Governor-General in Council and will continue in effect for a period of five years after union.

(2) The persons who at the time of union are in the employment of the Board or other Newfoundland fisheries services will become employees of the Department of Trade and Commerce.

Cost to be Borne by Federal Government: (3) The costs of maintaining the Fisheries Board including the cost of continuing the Board's fish trade representatives aboard and the outlays for administering the export laws will be met by the Federal Government.

The fish trade representatives of the Newfoundland Fisheries Board abroad (for which six positions exist and of which five are filled at present) will be continued as Board officials, and be paid out of funds voted for the Board during the Board's existence.

The Department of Trade and Commerce will absorb into the Canadian Trade Commissioner Service the two trade commissioners in London and New York, at present responsible to the Newfoundland Department of National Resources.

Export Tax to be Abolished: (4) The present export tax on salted fish of five cents a quintal will be abolished at the date of union, which is set for March 31, 1949.

Marketing Powers Limited to Salted Fish Only: (5) The alteration or repeal of any of these export marketing laws will be conditional during the five years following Confederation upon the consent of the Government of the Province of Newfoundland.

(6) The administration of these export marketing laws will be a function of the Newfoundland Fisheries Board serving as a federal agency and the powers of the Board will be exercised only in respect of the export marketing of salted fish (dry salted, pickled barrelled, Scotch cure or other salted fish, but not fresh, frozen, or canned fish or shellfish, marine animal oils, fish oils, or byproducts).

(7) After the end of the 5-year period, the export marketing laws and the Board's operating powers shall continue "until the Parliament of Canada otherwise provides."

(8) Other powers of administration which the Board may have exercised prior to union will become the concern of the general administrative service of the Canadian Department of Fisheries.

Federal Department Responsible for General Administration: (9) General fisheries administration in the Province of Newfoundland will be the responsibility of the Federal Department of Fisheries.

(10) The Federal Statutes which are now of general application in Canada with regard to fisheries will come into effect in the Province as soon as may be feasible after the union.

(11) As soon as practicable after completion of union, the Federal Fisheries services now carried on in Canada will be extended to the new Province.

Board Chairman or Member to Administer Federal Department in Province: (12) Under the terms of union, the administrative functions of the Department of Fisheries in the Province will be the responsibility of the Chairman of the Newfoundland Fisheries Board or such other Member of the Board as the Governor-General in Council may designate.

(13) Existing Newfoundland services in such fields as the protection and encouragement of the fisheries and operation of bait stations will be taken over by Federal authorities.

Bait Sales to Foreign Vessels to be Continued: (14) In some cases, amendments of these statutes (see No. 10 above) will be necessary to fit conditions in the Province. A case in point is the Customs and Fisheries Protection Act which now prohibits the sale of bait to foreign fishing vessels in territorial waters of Canada except under special treaty or convention. This prohibition would interfere with the continuation of the present Newfoundland practice with respect to such dealings in bait. In these circumstances, the Department of Fisheries has expressed willingness to recommend to Parliament that the existing Canadian law be suitably amended.

Present Trawlers Continue--New Licenses Subject to Efficiency and Community Welfare: (15) An amendment of the Canadian Fisheries Act will be introduced so that the present conditions as regard operations of Newfoundland trawlers may continue. The issuing of trawler licenses in the Province of Newfoundland after union will be based on securing maximum efficiency for the fishing industry and welfare for shore communities.

(16) In any interval which may occur between the time of union and the date when Canadian laws come into force in the Province, the existing Newfoundland laws are to continue operative.

Fish Wrappers and Packages: Wrappers provided by purchasers in the United States for their suppliers in Newfoundland will be dutiable after the date of Union, but will also be eligible for the 99 percent draw-back on re-export as containers of fresh frozen fish.

Efforts are being made to arrange for the continued use for export of the present stock of wrappers marked "Product of Newfoundland."

Importation of printed wrappers of all kinds made from paper for domestic use is prohibited at the present time, but permits may be granted by the Department of Finance in cases where the United States importer insists on supplying his own wrapper for the goods purchased by him in Canada. There is no restriction, however, on the importation of transparent wrappers or types of cardboard cartons or boxes usually used in the fish trade. These wrappers and containers are also eligible for the 99 percent draw-back on re-export as containers of fresh frozen fish.

Tariff Agreements: The position after Union of the agreement between Newfoundland and the Dominican Republic, providing for a low rate of duty on imports of Newfoundland cod into the latter country, is being examined. If necessary, the Canadian Government will initiate discussions on this matter.



Norway

DEMAND FOR NORWAY'S FISHING SMACKS: Norway's fishing fleet, hard hit by the invasion and occupation, has now surpassed prewar size, and is far superior in quality to the 1939 fleet, according to a recent Oslo report. Norwegian builders, who until now have found it difficult to meet home demand have recently noted a decrease in the number of ship orders and are contemplating prospects of fishing boat export. Several builders have recently received inquiries from interested fishing firms in South America and South Africa.

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EXPERIMENTAL FACTORY SHIP TO RENDER HERRING OIL: A Norwegian experimental floating factory ship to render herring oil at sea is scheduled to start operations within a year, with an estimated capacity of 20 to 30 tons of oil per hour. If successful, other ships will be modeled along the same lines, according to a December 24, 1948, consular report from the American Embassy at Oslo.

EXPORTS HERRING TO RUSSIA AND BIZONE GERMANY: For the year commencing November 1, 1947, Norway's exports of herring will probably total 455,600 barrels of large herring and 364,360 barrels of spring herring, with Russia absorbing 246,000 barrels of the large; and Bizon Germany, 264,000 barrels of the spring herring.

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TO FISH FOR GREENLAND COD: Failure of last year's cod catch off the Norwegian coast plus prospects of a continuing slump, have prompted many Norwegian fishermen to consider fishing for cod in the west Greenland area during the coming season, according to the Royal Norwegian Information Service.

At a recent meeting in the west coast port of Aalesund, backers of a new firm have decided to send a mothership to the west Greenland banks to take over the salting of cod delivered by Norwegian fishing boats. While only two Norwegian vessels fished for cod in these areas last year, an expedition of 60 vessels and a mothership with a base at Faeringhavn will be leaving next May to join in Greenland cod fishing during the coming season.

This year's market indicates a relatively stable demand for salted and salt-dried cod—a demand which Norwegian producers were not able to meet last year.

TO MARKET NEW WHALE BYPRODUCTS: With the delivery in Sandefjord, Norway, of the nearly-completed 27,000-ton whaling factory ship Kosmos V, its owner revealed that the vessel, though not yet fitted with factory equipment, will soon be equipped to manufacture new whale byproducts. The Kosmos V, Norway's largest vessel, will first serve with the whaling fleet in Antarctica this season as a tanker, following which it will return for refitting at a local yard.

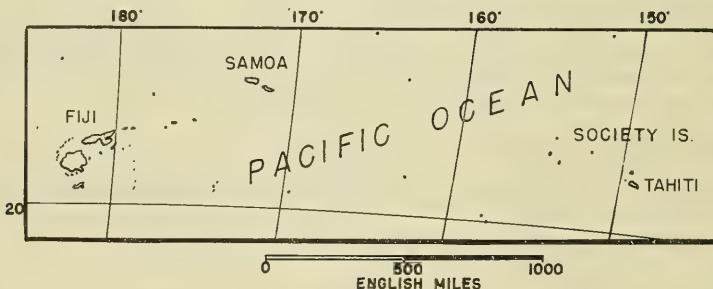
According to the owner, his firm's scientists have satisfactorily solved the problem of extracting insulin from the whale pancreas and commercial production of this article may be expected to begin soon. Production of vitamin concentrates from whale liver will henceforth take place aboard the factory ship, instead of at land factories as has heretofore been the case.

It was further revealed that a canning factory with a 2,000-ton capacity will be built aboard the Kosmos V for the processing of whale food products, as well as a plant for the production of whale meat extracts.



Pacific South Sea Islands

DEVELOPMENT OF TUNA FISHING INDUSTRY: Considerable interest is being displayed in the tuna fishing potentialities in the Pacific South Sea Islands area. In the past six months, several companies and operations have been proposed and started in the South Sea Islands area, according to reports from various sources.



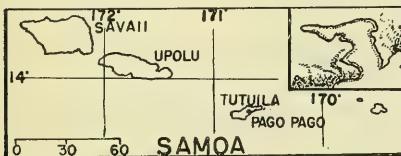
In addition, several California tuna fishing companies are investigating possibilities of tuna fishing operations in the United States Trust Territory of the Pacific Islands.

Fiji Islands: Tuna fishing operations in the vicinity of the Fiji Islands (British) are being considered by two new companies—one in the Fiji Islands and

the other a California tuna company. The Fiji company will have a capital 60 percent Fiji-held and 40 percent American-held, and the American company will have a capital 60 percent American-held and 40 percent Fiji-held. A 190-foot, 1,000-ton tuna fishing vessel with spotting plane is expected to arrive within the next month or two to begin operations. The smaller 50-foot fishing craft will be obtained locally.

The business of the company will be the catching and freezing of tuna and tuna-like fishes for shipment to the United States, and the fishing and canning of other varieties, particularly those which may prove desirable for British Empire markets. In addition, it is expected that these new companies will process fish meal, fertilizer, and vitamin oils for world markets, but with preference for the British Empire.

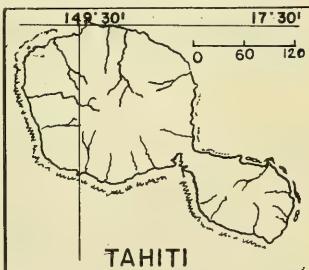
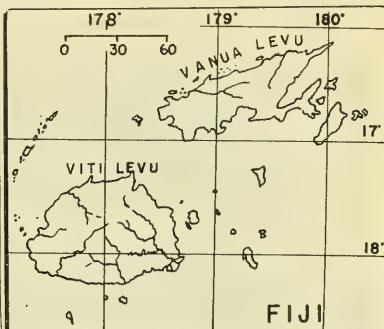
American Samoa: The proposed establishment of a tuna factory by an American corporation in Pago Pago, American Samoa, was recently announced. The cannery



PAGO PAGO
HARBOR

will be supplied with fish by a fleet of fishing craft operated by a Fiji Islands (British) company. The cannery will be fitted to pack 125,000 cases annually at first, with the possibility of doubling this quantity.

Tahiti: An American fishing company has an agreement with the Representative Assembly of Oceania of the Government of Tahiti (French) ready for signature. The agreement provides for a jointly held Franco-American (51 percent French-or Tahitian-held) company and is expected to receive the approval of the Franco-Tahitian Chamber shortly. A canning factory and a coastal vessel in Tahiti is owned at present by one of the new company's owners.



Peru

CANNED FISH LABELING AND QUALITY STANDARDS: Peru's Supreme Resolution No. 738, dated November 24, published in El Peruano of December 29, 1948, provides

for labeling and quality standards for fish canned by the local industry, according to a January 4 report from the American Embassy at Lima.

A brief resume' of the four articles comprising the resolution follows:

Article 1 - The following species of canned fish may be labeled "ATUN" (tuna):

- (a) Neothunnus macropterus (yellowfin tuna)
- (b) Germo alalunga (albacore)
- (c) Sarda chilensis (common bonito, Pacific)
- (d) Sarda velox (" " " ")
- (e) Katsuwonus pelamis (skipjack tuna)
- (f) Euthynnus alletterata (little tuna)

Article 2 - The following species of canned fish may be labeled "ANCHOA" (anchovy):

- (a) Anchoa panamensis
- (b) Anchoa nasus
- (c) Anchoa curta
- (d) Anchoa naso

Article 3 - The following species of canned fish may be labeled "SARDINA" (sardine):

- (a) Sardinops sagax
- (b) Harengula thrissina
- (c) Ethmidium chilca
- (d) Ilisha furthii

Article 4 - The Ministry of Agriculture will draw up the regulations to implement the standards specified in this resolution.

An official of the Dirección de Pesquería stated that the regulations mentioned in Article 4 would not be drawn up at once as information on the required standards is still being gathered from various sources.

Until such time as this regulation is published, it is impossible to determine what effect its application would have, if any, on the exports of Peruvian canned fish to the United States.

MOTORBOATS FOR FISHING INDUSTRY: On the basis of information gathered from reliable trade sources it is estimated that 120 motorboats were constructed in 1947--about 100 for the fishing industry and 20 for other purposes.

Usual sizes of motorboats for the fishing industry are: 36 ft. long, 9 ft. beam; 46 ft. long, 12 ft. beam; and 28 ft. long, double-ended craft. Some 60 percent of recent production has consisted of the smallest size boat with motors ranging from 15 to 40 h.p.; about 40 percent was of the first two types, equipped with marine engines varying from 40 to 100 h.p.

Motorboats are built exclusively of wood, principally Douglas fir, and only about 30 percent of the wood used is Peruvian. The quality of the boats is reported to be satisfactory.

Production is centered in Peru's principal port, Callao, where four shipyards are in operation. The trend of construction of commercial power craft is upward, boosted by the expanding fishing industry.

The production of marine accessories, equipment, and hardware (consisting principally of small iron and brass fittings and a few simple parts for Diesel engines) is commercially insignificant.

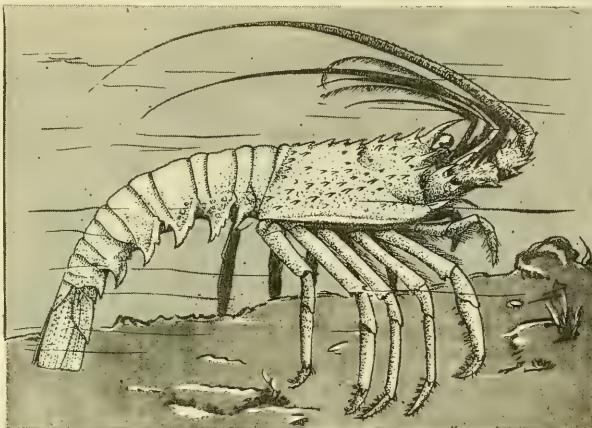
Republic of the Philippines

EXPLORATION OF SPINY LOBSTER FISHERY: An excellent opportunity for an industry lies in the fishing and marketing of Philippine spiny lobsters, according to a December 17 report from the Administrator of the Service's Philippine Fishery Program and officials of the Philippine Bureau of Fisheries. With the recent addition of the David Starr Jordan to the research fishery fleet of the Program, exploration plans for the spiny lobster fishery have been made possible.

Spiny lobsters, according to a recent survey, abound along the Philippine coast and are fished by Filipino fishermen, although on a scale not large enough to constitute an industry.

The Philippine method of spearing the spiny lobster kills it. It is the purpose of the Program's technicians to introduce the use of such fishing gear as nets and traps which will enable fishermen to catch the spiny lobsters alive. Methods of preserving the catch by processing, packing in cellophane and freezing, and chilling with ice will also be studied.

Lobsters, a much valued delicacy everywhere in the world, command a relatively steady high price. Currently wholesaling in Manila at four to five pesos (\$2.00 to \$2.50) each, these crustaceans, it has been learned, can be obtained for as little as 25 centavos (12½ cents) each in certain localities of the Philippines. The current demand, even in Manila, is limited but it is believed that a flourishing market could be developed in a relatively short time.



SPINY LOBSTER (*PANULIRUS PENICILLATUS*) RANGE - RED SEA TO CAPE OF GOOD HOPE, NORTH COAST OF AUSTRALIA TO HAWAIIAN ISLANDS.



Poland

BUDGET FOR 1949 INCLUDES EXPENDITURES FOR FISHERIES: The 1949 budget estimates, together with the investment plan, approved by the Council of Ministers of the Polish Government, provides for a 30 percent increase in expenditures for the financing of new undertakings connected with the fisheries, according to a December 22, 1948, report from the American Consulate at Warsaw.



Seychelles Islands

FISHING INDUSTRY: The purchase of the island of St. Anne (500 acres), the largest of the four islands forming the outer perimeter of Port Victoria harbor, was announced in November 1948, according to a November 15 report from the American Consulate at Mombasa, Kenya Protectorate.

The Government intended a small part for use of the fishing industry. Before the First World War, this part served as a base for Norwegian whale fisheries.

As reported in the Seychelles "Annual Report for 1946," the fishing industry was confined to production for local needs. There was only one motor vessel engaged in deep-sea fishing, the bulk of the production being carried out in pirogues and rowing boats by fishermen who rarely went out of sight of land. It would appear that the fishing industry has not improved because of lack of vessels, and because the fishermen, like the laborer, appears to be content with less money than he could obtain by full-time labor. A survey was made in 1946 of the fishery resources by a marine biologist and his estimation was 120,000 metric tons per annum.



Spain

FOREIGN FISH TRADE IN RECENT YEARS: Traditionally, Spain has been both a major importer and exporter of fish. In the years 1933-35, immediately prior to the Civil War, average annual imports totaled approximately 60,000 metric tons valued at \$8.7 million; exports reached 31,000 metric tons with a value equivalent to \$7.4 million. The Spanish Civil War (1936-39) and World War II disrupted the trade, and as a result of difficulties caused by those conflicts, the volume decreased sharply. From 1946 to 1948, the quantity of yearly imports averaged only about one-seventh, and exports less than one-fourth, of the 1933-35 movement (imports 9,000 and exports 7,000 metric tons), according to a December 1 report from the American Embassy at Madrid.

The unit value of fish imports and exports moved to higher levels during the past few years. Even though the volume of trade registered a tremendous loss as compared with the pre-Civil War position, the average value of imports from 1946 to 1948 was placed at \$5.2 million and exports \$7.7 million, annually. The latter was an actual gain over the earlier period, although the quantity was less than one-fourth as great.

Imports: Spain's fish imports have consisted almost entirely of cod. Iceland, Denmark, Norway, and Newfoundland were the principal suppliers prior to the Civil War, but in the last several years most of the business has been done by only Newfoundland and Norway. The quantity of cod imported dropped from a yearly average of 57,700 metric tons during the pre-Civil War 1933-35 period, to only 8,500 metric tons from 1946-48. The domestic demand for cod is strong, and it seems probable that it will remain so.

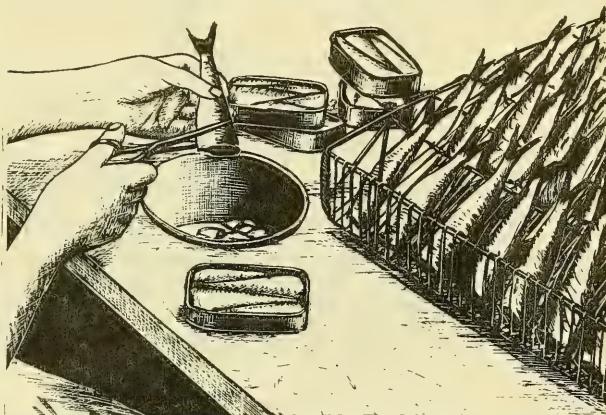
Exports: Canned sardines formerly accounted for roughly two-thirds of the total volume of Spain's exports of fish. But in the last few years, sardine runs have not been as abundant, and packers have also experienced a shortage of essential canning materials, especially tinplate. These factors have brought about a sharp drop in exports. Whereas, the yearly trade in sardines from 1933 to 1935 averaged 19,400 metric tons, it had shrunk to a mere 2,700 metric tons in 1946 to 1948.

Prices rose, but not enough to overcome the decrease in volume, and consequently, there has been a loss, as compared with 1933-35, amounting to the equivalent of several million dollars annually. Fortunately, however, the value of other fish exports swung upward so that the total movement based on value from 1946 to 1948 was slightly ahead of the pre-Civil War period.

The principal outlets for fish during 1933-35 were Italy, Argentina, Germany, and France, although shipments had a worldwide distribution. On the basis of value, Italy alone accounted for 38 percent of the total, and together with the other three countries named, absorbed well over two-thirds of the entire amount. Italy is now by far the most important single market, and from 1946-48 took almost two-thirds of Spain's fish exports based on value. While purchases by the United States have figured only in a relatively minor way in the total export trade, nevertheless, they have been a significant source of much-needed dollar exchange.

Outlook: Spain unquestionably is following a policy aimed at eliminating the necessity of importing cod by expanding her fleet. Barring unforeseen developments, it seems reasonable to expect a decrease in dependence upon other nations for her supply of cod.

It is quite clear that the Government would like to see exports stepped up to a level more nearly approaching the pre-Civil War volume. But for several years, canners have been discouraged and hampered by a shortage of olive oil, tinplate, and other essential items, as well as having price difficulties. If the industry and the authorities solve these problems, and it appears that they may achieve at least a partial solution, canners will again be in a favorable position to turn out a large pack. This is also contingent, of course, upon the supply of sardines. During the past year or so, it has been reported that they have not been as plentiful in Spanish waters as previously, and there has been considerable discussion as to whether this may be a temporary condition.



PRODUCTION LINE IN SPANISH SARDINE CANNERY - WOMEN TAKE FISH FROM SPECIAL SHAPED WIRE BASKETS, CUT TO CONVENIENT SIZE, AND PACK IN CANS. FISH ARE PLACED IN THE BASKETS DIRECTLY FROM THE BRINE TANK.

Trinidad

TO PRODUCE SHARK LIVER OIL: Trinidad has decided to set up a pilot plant for the extraction of shark liver oil, according to the Canadian periodical, Foreign

Trade, of December 18. Samples are of good market value and, although initial production will satisfy only local demands, it is thought that an export market could be built up.



Union of South Africa

PROHIBITS FISH IMPORTS, EXCEPT SARDINES: The list of prohibited imports given in Government Notice No. 2386, of the Union of South Africa, dated November 5, 1948, includes "fish: other, except sardines," according to a December 14 report from the American Legation at Pretoria.

Inasmuch as some Californian pilchards are exported to South Africa and are described as "sardines," the South African Commissioner of Customs and Excise has advised that for import control purposes the term "sardine" is regarded as including brislings, sild, and other similar small fish packed in oil. However, pilchards which are packed in tomato sauce are included in the prohibited list.



United Kingdom

DEVELOP NEW HERRING CURE FOR TROPICS: A new method of curing herring for export to tropical countries for consumption by natives has been developed as a result of experiments, reported in a report of the United Kingdom Herring Industry Board, according to the December 25 issue of the Canadian periodical, Foreign Trade.

Herring mechanically split and cleaned were cured in a high concentration of brine and subsequently drained. Given the name "dry cured" to distinguish them from pickled cured herring in barrels, samples were packed into wooden cases and dispatched to certain parts of Africa in December 1947. Reports received have been very encouraging. The herring arrived in good condition and there is every reason to believe that this product could compete successfully both as regards price and quality with locally-caught fish, besides providing an excellent variation to, and an improvement in, the diet of many native peoples.

* * * * *

NEW ORDER CONTINUES PRICE CEILINGS FOR FISH: The Fish (Maximum Prices) Order, 1948, S. I. No. 2610, which went into effect December 4 and 5, 1948, provides that no person shall sell or buy any fish at a price exceeding the price applicable in accordance with the schedules which are part of the Order. All fish are included except pilchard, sprats, mackerel, horse mackerel, sturgeon, salmon, trout, eels (except conger eels), smelt, shad, whitebait, bass, gray mullet, red mullet, and shellfish.

This Order replaces the Fish (Control and Maximum Prices) Order, 1947, as amended. The principal modifications in the present Order are as follows:

1. The maximum prices of all varieties of headless fish, except dogfish and wings of ray or skate, are reduced by five cents per stone (14 pounds) on a first hand sale (primary wholesaler level);

2. Cooked fish, with exception of roes, milts, smokies, and bucklings, is removed from price control;
3. A maximum retail price of 22 cents per pound is prescribed for hake fillets.
4. The reference to immature fish is now omitted as this is now covered by the Sea Fishing Industry (Immature Sea Fish) Order, 1948.

* * * * *

FISHING OFF GREENLAND AND NEWFOUNDLAND: On account of the small catches from the Bear Island fishing grounds and the closing of the White Sea Banks, several large trawlers from Hull, Fleetwood, and Grimsby, England, have gone during the past few months to both the west and east coast fishing grounds off Greenland, according to a recent article in the October 23 issue of The Fishing News of Aberdeen, Scotland. Landings up to 300,000 pounds per vessel have been made.

At least one trawler has fished on the Newfoundland Banks.

* * * * *

PURCHASES CANNED SALMON FROM U.S.S.R.: The British Ministry of Food had applied on a number of occasions for an allocation of dollars for the purchase of Canadian salmon, but, because of the shortage of dollars, the order was placed with the U.S.S.R., which has promised supplies of 330,000 to 360,000 cases of canned salmon and canned crab in 1949, according to the January 1949 Trade News of the Canadian Department of Fisheries. The Russians are short of sterling in view of their large purchases of rubber, wool, etc., from the Sterling Area, and this tinned fish was purchased from them outright, regardless of any further developments in connection with the proposed extension of the United Kingdom-Russian trade agreement of 1947. In conformity with a custom existing since the war, of giving preference in tinplate supplies to such countries that in turn supply tinned food to Great Britain, the United Kingdom will export to the Soviet Union as much tinplate as will be needed to fill the contract.

* * * * *

FINANCIAL ASSISTANCE TO SCOTTISH FISHERMEN IN 1947: Grants and loans are available to fishermen for the acquisition of boats and gear, mainly used for catching white fish and shellfish, under the Inshore Fishing Industry Act, 1945; and under the Herring Industry Act, 1944, for boats used mainly for herring fishing, according to an October 28 consular report from the American Embassy at London. At the end of 1947, the assistance offered to Scottish fishermen under these Acts was \$1,593,970 in grants and \$2,745,421 in loans, covering the construction of 137 new vessels, 42 ex-Admiralty vessels and the purchase and reconditioning of 147 vessels. Of these boats, 50 new vessels and 30 ex-Admiralty vessels began fishing during the year.

Many of the activities of the Herring Industry Board are financed with assistance from the British Government and, during 1947, grants and advances for working capital were made to the Board.

* * * * *

NORTHERN IRELAND PROHIBITS SALE OR POSSESSION OF IMMATURE FISH: An order, prohibiting the sale or possession of immature sea fish in Northern Ireland was

issued in compliance with provisions of the International Fisheries Convention held in London in 1946 to control the North Sea fishing, and to which the United Kingdom is a signatory. The Sea Fishing Industry (Immature Sea Fish) Order, 1948, dated July 30, 1948, is made under Section 1 of the Sea Fishing Industry Act (Northern Ireland), 1933, which empowers the Ministry of Commerce to prescribe minimum sizes of sea fish to be sold in Northern Ireland, according to an American consular report of September 21 from Belfast.

Several orders of this nature were issued before the war, but the need for increased food supplies necessitated their revocation at the outbreak of the war. Although the general food situation has not become normal, the intensive fishing of the North Sea has so reduced the stocks of fish there that it was realized that conservation measures would have to be taken again.

The Order is similar to the one issued for England and Scotland (See Commercial Fisheries Review, July 1948, page 29; August 1948, page 49) except for the sizes of whiting and dabs which are $1\frac{1}{2}$ " and 1" longer than the required sizes in Great Britain. The landings of whiting in the seas adjoining Northern Ireland are of vital importance to Northern Ireland's fishing industry, inasmuch as 90 percent of the catch is marketed in Great Britain.



International

ANTARCTIC WHALING, 1948-49 SEASON: In the Antarctic this year, 18 whale factory ships will be operating, according to the Royal Norwegian Information Service. The 1948-49 season opened December 15 and is scheduled to close on April 7. If the season's quota of whales is reached before this date, it will end when the quota is reached without going for the full period allowed.

Norway again heads the list of countries engaged in Antarctic whaling. A total of 6,000 Norwegians will be engaged in whaling operations in Antarctic waters. Crews and workmen aboard the 10 Norwegian floating factories and 100 catching vessels will include some 4,000 men. Adding those Norwegians employed at land stations, as well as those serving aboard British vessels, the total will approximate 6,000. The floating factory Thorshóvdi, most recent addition to the Norwegian whaling fleet, and all units of the Norwegian fleet were expected to be in the field by mid-December.

In addition to Norway, Great Britain will operate four ships with 53 catching vessels, but the crews will consist of 2,000 Norwegians. The largest single expedition will be the British factory ship, Balaena, which will consist of 20 catching vessels. One of the catchers will experiment with a new electric harpoon.

Once again, Japan has been allowed to send two expeditions, and two factory ships have cleared for the Antarctic. Although research on the use of electric harpoons in the Japanese whaling industry was conducted before World War II, a practical electric harpoon was never developed, and none is being used by the Japanese at present.

The Netherlands will operate one ship with 10 catching vessels, having added two converted corvettes to the fleet.

The Russian factory ship, Slava, will operate in the Antarctic whaling grounds, but in contrast to last season, there will be no Norwegian whalers serving aboard, according to Oslo press reports.



FEDERAL ACTIONS

Department of the Interior

FISH AND WILDLIFE SERVICE

CODIFICATION OF ALASKA FISHERY REGULATIONS: The Federal Register of December 29 carried a complete recodification of the Alaska commercial fishery regulations in effect as of that date. This is a periodic, routine process for conforming to the prescribed scope and style of the Code of Federal Regulations, as approved by the President, and should not be confused with the new regulations for 1949 which will be released early this year.

No substantive changes in meaning are embodied in the codification other than Part I, containing definitions of terms. Other alterations include editorial changes and a reorganization of structure and outline.

Future changes will be based upon this codification rather than upon the regulations as previously published.



Department of the Treasury

TARIFF-RATE QUOTA (1949) OF GROUNDFISH, INCLUDING ROSEFISH, FILLETS: The following establishing a 1949 tariff-rate quota for groundfish, including rosefish, fillets appeared in the Federal Register of January 25, 1949:

FISH

TARIFF-RATE QUOTA

January 17, 1949

The tariff-rate quota for the calendar year 1949 on certain fish dutiable under paragraph 717 (b), Tariff Act of 1930, as modified purusant to the General Agreement on Tariffs and Trade (T. D. 51802).

In accordance with the proviso to item 717 (b) of Part I, Schedule XX of the General Agreement on Tariffs and Trade (T. D. 51802), it has been ascertained that the average aggregate apparent annual consumption in the United States of fish, fresh or frozen (whether or not packed in ice), filleted, skinned, boned, sliced, or divided into portions, not specially provided for: Cod, haddock, hake, pollock, cusk, and rosefish, in the 3 years preceding 1949, calculated in the manner provided for in the cited agreement, was 179,209,128 pounds. The quantity of such fish that may be imported for consumption during the calendar year 1949 at the reduced rate of duty established pursuant to that agreement is, therefore, 26,881,369 pounds.

Department of State

U. S.-MEXICO INTERNATIONAL COMMISSION FOR THE SCIENTIFIC INVESTIGATION OF TUNA: A Convention between the United States and Mexico for the establishment of an International Commission for the Scientific Investigation of Tuna was signed on January 24 at Mexico City by representatives of the two Governments, the Department of State announced. This action was taken as the result of recommendations made by delegates to a conference which met in Mexico City from October 25 to November 4 to discuss fish conservation matters of common concern to the two countries.^{1/}

The Convention provides for a Commission composed of two national sections and four members each, which will engage in scientific investigation of the tuna and tuna-like fishes of the eastern Pacific Ocean, as well as those fishes which are used for bait in the tuna fisheries. The scientific information now available, based on studies made in the past, is not sufficiently extensive, the Department pointed out, to indicate whether or not tuna stocks are now in danger of depletion or may be in the near future. The two countries will cooperate in this enterprise with the long-range view of maintaining the populations of these fishes at a level which will assure a maximum reasonable utilization, year after year, without depletion.

The text of the Convention (Convention Between the United States of America and the United Mexican States for the Establishment of an International Commission for the Scientific Investigation of Tuna), except for a few minor changes, conformed to the proposed Convention published in the December issue of this Review.^{1/}

Given below are only those sections which were amended:

PREAMBLE

The President of the United States of America:

Walter Thurson, Ambassador Extraordinary and Plenipotentiary of the United States of America in Mexico;

The President of the United Mexican States:

Manuel Tello, Acting Minister for Foreign Relations;
who, having communicated to each other their full powers, found to be in good and due form, have agreed as follows:

ARTICLE I

7. At its first meeting the Commission shall select a chairman from the members of one national section and a secretary from the members of the other national section. The chairman and secretary shall hold office for a period of one year. During succeeding years, selection of the chairman and secretary shall alternate between the respective national sections.
9. The Commission shall be entitled to adopt and to amend subsequently, as occasion may require, by-laws or rules for the conduct of its meetings and for the performance of its functions and duties. Such by-laws, rules or amendments shall be referred by the Commission to the Governments and shall become effective, thirty days from the date of receipt of notification unless disapproved by either of the two Governments within that period.

^{1/}See Commercial Fisheries Review, December 1948, p. 63.

13. The Commission shall designate simultaneously a Director and an Assistant Director of Investigations, who shall be technically competent and shall be responsible to the Commission. One of these functionaries shall be a national of the United States and the other a national of Mexico. Subject to the instruction of the Commission and with its approval, the Director shall have charge of:

ARTICLE III

3. In the event of termination of the Convention, property supplied to the Commission by the High Contracting Parties shall be returned to that High Contracting Party which originally provided it. Property otherwise acquired by the Commission, with the exception of the archives, shall be returned to the High Contracting Parties taking into account the proportion in which they shall have contributed to the expenses of the Commission.

4. At the termination of this Convention the High Contracting Parties shall divide the archives of the Commission as follows: The United States of America shall receive the part in English; and the United Mexican States, the part in Spanish. Either of the two countries shall be able to obtain certified copies of any document from the archives of the Commission which is in the possession of the other. These archives may be consulted at any time for this purpose by authorized representatives of the government not having in its possession the archives which it wishes to consult. This paragraph shall be subject to the provisions of Paragraph 17 of Article I of this Convention.



Eighty-first Congress

JANUARY 1949

PUBLIC BILLS AND JOINT RESOLUTIONS INTRODUCED AND REFERRED TO COMMITTEES:
Listed below are all the public bills and joint resolutions introduced and referred to committees by the Eighty-First Congress which affect in any way the fisheries and fishing and allied industries. The bills are listed in the order in which they were introduced.

House of Representatives:

H. R. 71 (Hale) - A bill to confirm and establish the titles of the States to lands and resources in and beneath navigable waters within State boundaries and to provide for the use and control of said lands and resources; to the Committee on the Judiciary.

H. R. 178 (Farrington) - A bill to amend the National School Lunch Act with respect to the apportionment of funds to Hawaii and Alaska; to the Committee on Education and Labor.

H. R. 180 (Gossett) - A bill to confirm and establish the titles of the States to lands beneath navigable waters within State boundaries and natural resources within such lands and waters and to provide for the use and control of said lands and resources; to the Committee on the Judiciary.

H. R. 216 (Bartlett) - A bill transferring the jurisdiction, supervision, administration, and control over the salmon and other fisheries of Alaska, except the fur-seal and sea-otter fisheries, from the Department of the Interior to the Territory of Alaska, and for other purposes; to the Committee on Merchant Marine and Fisheries.

H. R. 230 (Bland) - A bill to promote effectual utilization of the fishery resources of the United States; to the Committee on Merchant Marine and Fisheries.

H. R. 334 (Boggs of La.) - A bill to confirm and establish the titles of the States to lands and resources in and beneath navigable waters within State boundaries and to provide for the use and control of said lands and resources; to the Committee on the Judiciary.

H. R. 341 (Celler) - A bill relating to the rights of the several States in lands beneath inland navigable waters and to the recognition of equities in submerged coastal lands adjacent to the shores of the United States, and for other purposes; to the Committee on the Judiciary.

H. R. 354 (Celler) - A bill to promote the development and conservation of certain resources in the submerged coastal lands adjacent to the shores of the United States; to the Committee on Public Lands.

H. R. 427 (Jackson of Wash.) - A bill to establish a Columbia Valley Authority to provide for integrated water control and resource development on the Columbia River, its tributaries, and the surrounding region in the interest of the control and prevention of floods, the irrigation and reclamation of lands, the promotion of navigation, the providing of employment, the strengthening of the national defense, and for other purposes; to the Committee on Public Works.

H. R. 849 (Hope) - A bill to establish conservation and orderly development of the Nation's agricultural land and water resources as a basic policy of the United States, to provide for a national agricultural and land-and-water conservation program, and for other purposes; to the Committee on Agriculture.

H. R. 860 (McDonough) - A bill to confirm and establish the titles of the States to lands and resources in and beneath navigable waters within State boundaries and to provide for the use and control of said lands and resources; to the Committee on the Judiciary.

H. R. 936 (Allen) - A bill to confirm and establish the titles of the States to lands and resources in and beneath navigable waters within State boundaries and to provide for the use and control of said land and resources; to the Committee on the Judiciary.

H. R. 960 (Potter) - A bill to establish rearing ponds and a fish hatchery at or near Charlevoix, Mich.; to the Committee on Merchant Marine and Fisheries.

H. R. 961 (Potter) - A bill to establish rearing ponds and a fish hatchery; to the Committee on Merchant Marine and Fisheries.

H. R. 962 (Potter) - A bill to establish rearing ponds and a fish hatchery at or near Rogers City, Mich.; to the Committee on Merchant Marine and Fisheries.

H. R. 963 (Potter) - A bill to establish rearing ponds and a fish hatchery at or near St. Ignace, Mich.; to the Committee on Merchant Marine and Fisheries.

H. R. 986 (Harter) - A bill authorizing and directing the United States Fish and Wildlife Service of the Department of the Interior to undertake a continuing study of species of fish of particular interest to sports anglers of the Atlantic coast, with respect to the biology, propagation, catch records, and abundance of such species, to the end that such Service may recommend to the several States of the Atlantic coast through the Atlantic States Marine Fisheries Commission appropriate measures for increasing the abundance of such species and promoting the wisest utilization thereof; to the Committee on Merchant Marine and Fisheries.

H. R. 1140 (Bartlett) - A bill to protect and conserve the salmon fisheries of Alaska; to the Committee on Merchant Marine and Fisheries.

H. R. 1182 (Boggs) - A bill to amend section 3469 (b) of the Internal Revenue Code to provide that the tax imposed on transportation of persons shall not apply to transportation on boats for fishing purposes; to the Committee on Ways and Means.

H. R. 1199 (Rogers) - A bill making an appropriation for the construction and operation of a fish hatchery at North Attleboro, Mass.; to the Committee on Appropriations.

H. R. 1212 (Doyle) - A bill to confirm and establish the titles of the States to lands beneath navigable waters within State boundaries and natural resources within such lands and waters and to provide for the use and control of said lands and resources; to the Committee on the Judiciary.

H. R. 1222 (Jackson) - A bill to authorize the exchange of certain fishery facilities within the State of Washington; to the Committee on Merchant Marine and Fisheries.

H. R. 1230 (King) - A bill to establish a national natural resources policy; to create a Natural Resources Council, to provide for a natural resources inventory, and for other purposes; to the Committee on Public Lands.

H. R. 1410 (Passman) - A bill to confirm and establish the titles of the States to lands and resources in and beneath navigable waters within State boundaries and to provide for the use and control of said lands and resources; to the Committee on the Judiciary.

H. R. 1515 (Bartlett) - A bill to provide for the gradual elimination of salmon traps in the waters of Alaska; to the Committee on Merchant Marine and Fisheries.

H. R. 1542 (Grant) - A bill granting the consent and approval of Congress to an interstate compact relating to the better utilization of the fisheries (marine, shell, and anadromous) of the Gulf coast and creating the Gulf States Marine Fisheries Commission; to the Committee on Merchant Marine and Fisheries.

H. R. 1705 (Bennett of Fla.) - A bill granting the consent and approval of Congress to an interstate compact relating to the better utilization of the fisheries (marine, shell, and anadromous) of the Gulf coast and creating the Gulf States Marine Fisheries Commission; to the Committee on Merchant Marine and Fisheries.

H. R. 1719 (Larcade) - A bill granting the consent and approval of Congress to an interstate compact relating to the better utilization of the fisheries (marine, shell, and anadromous) of the Gulf coast and creating the Gulf States Marine Fisheries Commission; to the Committee on Merchant Marine and Fisheries.

H. R. 1746 (Dingell) - A bill to provide that the United States shall aid the States in fish restoration and management projects, and for other purposes; to the Committee on Merchant Marine and Fisheries.

H. R. 1825 (Boykin) - A bill granting the consent and approval of Congress to an interstate compact relating to the better utilization of the fisheries (marine, shell, and anadromous) of the Gulf coast and creating the Gulf States Marine Fisheries Commission; to the Committee on Merchant Marine and Fisheries.

H. R. 1832 (Hand) - A bill to provide that the tax on the transportation of persons shall not apply to transportation on boats for fishing purposes; to the Committee on Ways and Means.

Senate:

S. 35 (McCarran) - A bill to establish a national natural resources policy, to create a Natural Resources Council, to provide for a national resources inventory, and for other purposes; to the Committee on Interior and Insular Affairs.

S. J. Res. 42 (Sparkman) - Joint resolution granting the consent and approval of Congress to an interstate compact relating to the better utilization of the fisheries (marine, shell, and anadromous) of the Gulf coast and creating the Gulf States Marine Fisheries Commission; to the Committee on Interstate and Foreign Commerce.

S. 64 (Maybank) - A bill to establish a Savannah Valley Authority to provide for unified water control and resource development in the basin of the Savannah River in the interest of the control and prevention of floods, the promotion of navigation, and the strengthening of the national defense, and for other purposes; to the Committee on Public Works.

S. 155 (Knowland) - A bill to confirm and establish the titles of the States to lands beneath navigable waters within State boundaries and natural resources within such lands and waters and to provide for the use and control of said lands and resources; to the Committee on Interior and Insular Affairs.



THE CUBAN FISHING INDUSTRY

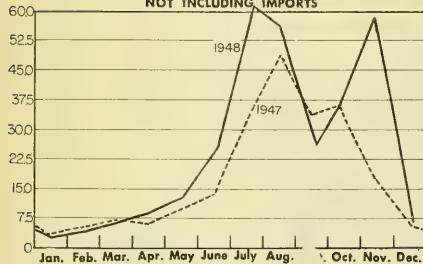
It is estimated that there are 9,000 fishermen permanently employed in Cuba. About 500 of these in Habana are members of the only fishermen's union. Some 3,000 additional men fish sporadically, depending on whether remuneration in other industries is better or worse. Also employed directly by the industry are roughly 1,000 men, including sail-makers, carpenters, calkers, etc. In addition, about 6,000 men are indirectly employed in the transportation, sale, and packing of fish.

LANDINGS AND RECEIPTS

In Millions of Pounds

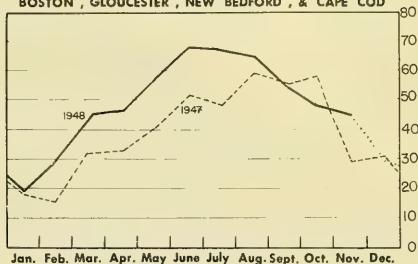
MAINE - LANDINGS *

NOT INCLUDING IMPORTS



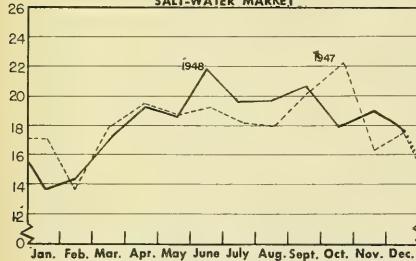
MASSACHUSETTS - LANDINGS

BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE COD



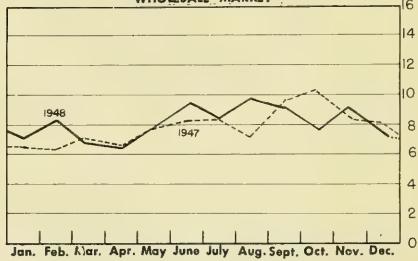
NEW YORK CITY-RECEIPTS OF FRESH & FROZEN FISH

SALT-WATER MARKET



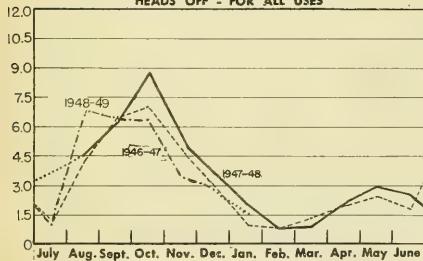
CHICAGO - RECEIPTS OF FRESH & FROZEN FISH

WHOLESALE MARKET



GULF - SHRIMP LANDINGS

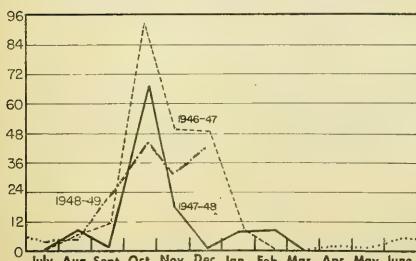
HEADS OFF - FOR ALL USES



In Thousands

of Tons

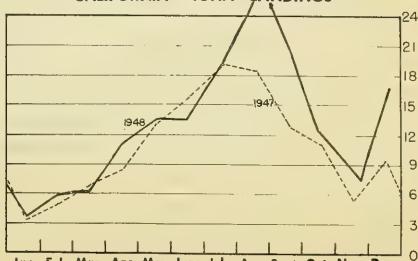
CALIFORNIA - PILCHARD LANDINGS



.....ESTIMATED

*REVISED

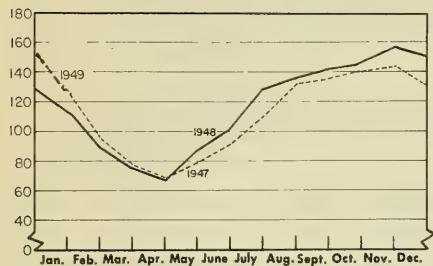
CALIFORNIA - TUNA LANDINGS



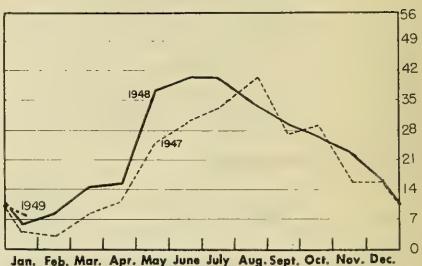
COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

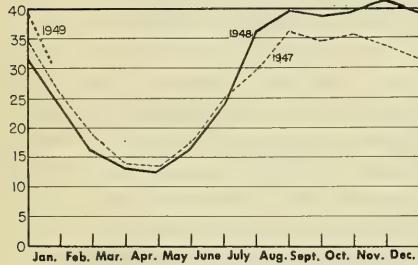
U.S. & ALASKA - HOLDINGS OF FROZEN FISH



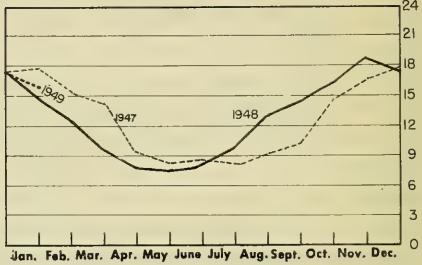
U.S. & ALASKA - FREEZINGS



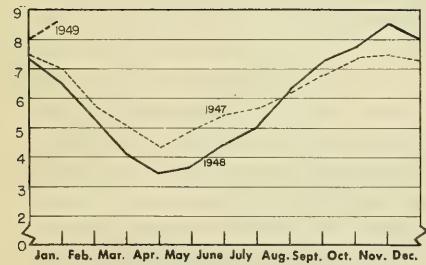
NEW ENGLAND - HOLDINGS OF FROZEN FISH



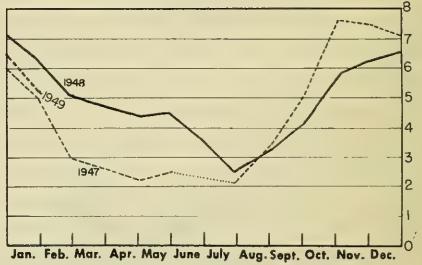
NEW YORK CITY - HOLDINGS OF FROZEN FISH



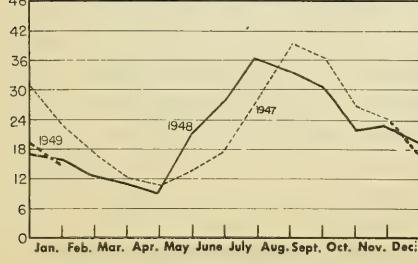
CHICAGO - HOLDINGS OF FROZEN FISH



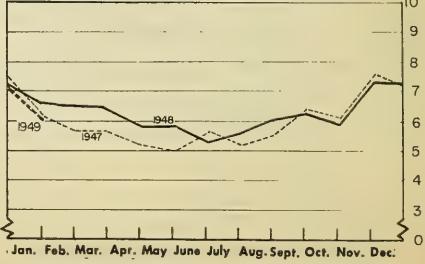
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH



CALIFORNIA - HOLDINGS OF FROZEN FISH

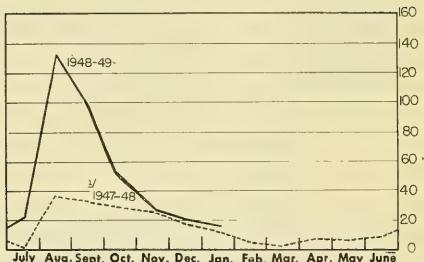
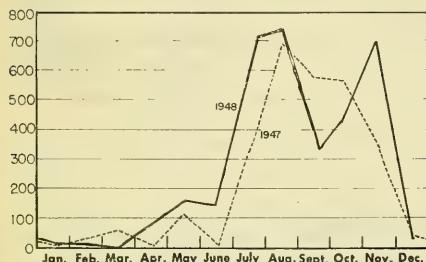


CANNED FISHERY PRODUCTS

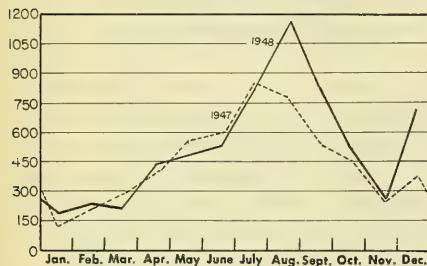
In Thousands of Standard Cases

MAINE - SARDINES, ESTIMATED PACK *

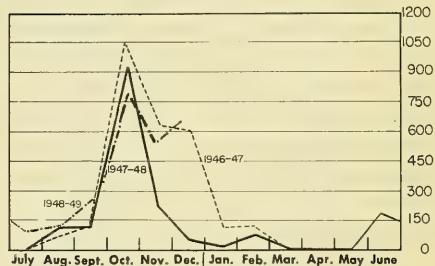
UNITED STATES - SHRIMP



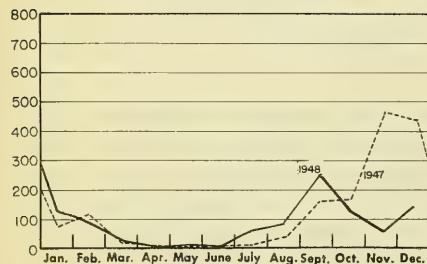
CALIFORNIA - TUNA



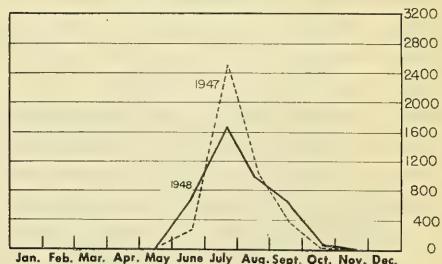
CALIFORNIA - PILCHARDS



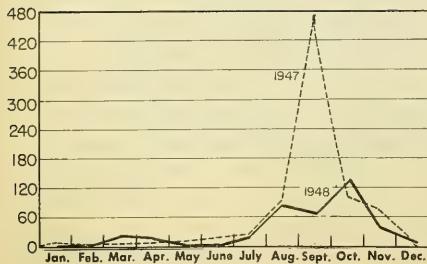
CALIFORNIA - MACKEREL



ALASKA - SALMON



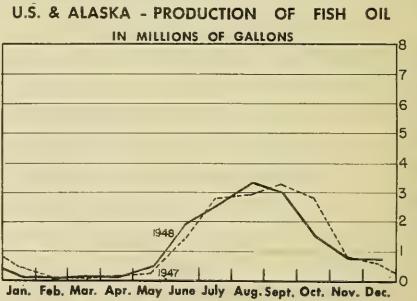
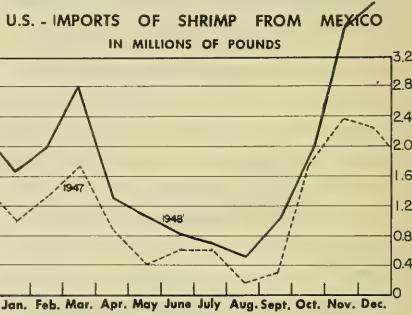
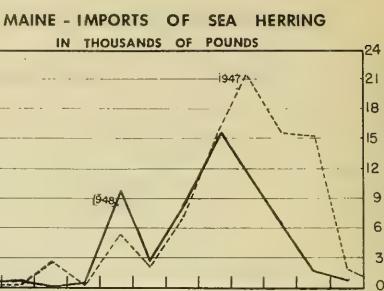
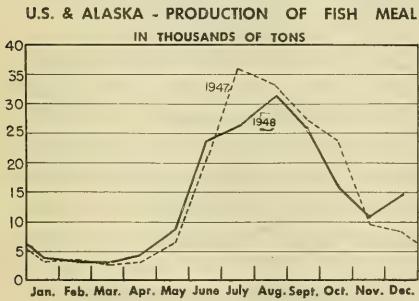
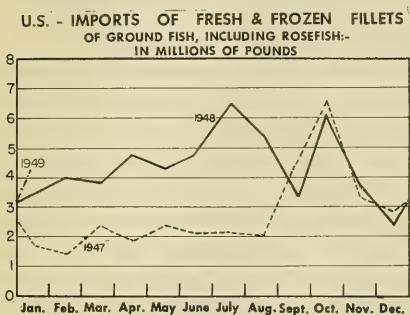
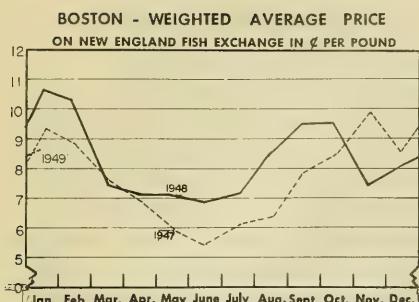
WASHINGTON - PUGET SOUND SALMON *



STANDARD CASES

Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	No. 1 picnic	7 oz.
TUNA *	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
MACKEREL	48	No. 300	15 oz.
SALMON	48	1.pound tall	16 oz.

PRICES, IMPORTS and BY-PRODUCTS





Recent publications of interest to the commercial fishing industry are listed below.

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
 FL - FISHERY LEAFLETS.
 MOL - MARKET DEVELOPMENT SECTION LISTS OF DEALERS, LOCKER PLANTS, ASSOCIATIONS, ETC.
 SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
 SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-433	- Fisheries of the United States and Alaska, Annual Summary, 1945
CFS-437	- Maine Landings, Annual Summary, 1947
CFS-439	- Packaged Fish, Annual Summary, 1947
CFS-440	- Massachusetts Landings, June 1948
CFS-441	- Maine Landings, September 1948
CFS-443	- Frozen Fish Report, December 1948
CFS-444	- Canned Fish and Byproducts, Annual Summary, 1947
CFS-445	- Fish Meal and Oil, October 1948
CFS-446	- Fish Meal and Oil, November 1948
FL-168 (Revised)	- Instructions for Obtaining Laws and Regulations Governing the Commercial Fishing Industry of the United States and Alaska
FL-255 (Revised)	- Fishery Motion Pictures
FL-324	- Packaging Frozen Fishery Products
Sep. 209	- Effect of Refreezing on Quality of Sea Trout Fillets

A Report on the Appearance of the Fungus ICHTHYOSPORIDIUM HOFERI in the Herring of the Northwestern Atlantic, by L. W. Scattempood, Special Scientific Report No. 58, 41 p., illus. with tables and figures, processed. Limited distribution. This publication presents the basic facts relating to parts of the life history of the fungus (identical or similar to *Ichthyosporidium hoferi*) attacking the herring in the Northwestern Atlantic, and the pathological symptoms it produced in the fish. Included in this report are: (1) the development of a practical, accurate, and rapid method by which a layman can identify a fish afflicted with the condition known as "pepper spot;" (2) the development of a practical, rapid, and economical method of sorting out affected fish in the canning plants; (3) the development of a sampling technique to insure that any lot of canned fish will meet the requirements of any governmental inspection agency; (4) the continuous charting of the geographic incidence of the infection; (5) a statistical analysis of the course of the epidemic; (6) an estimation of the effect of the epidemic on the abundance of the sardine population; (7) a survey of the literature of the diseases of marine commercial fishes.

* * *

On Use of Imported Seed Oysters on Connecticut Beds, Bulletin No. 1, Vol. 13, January 17, 1949, 6 p., mimeographed, free. Available upon request from Fishery Biological

Laboratory, Fish and Wildlife Service, Milford, Conn. Gives some preliminary data on an extensive series of observations on the survival, growth, and gonad development of oyster sets collected from different coastal regions from Massachusetts to the Gulf of Mexico and brought to Milford to be grown under identical conditions in Connecticut waters, with the State's own set of 1948 serving as the control.

MISCELLANEOUS PUBLICATIONS

THE FOLLOWING PUBLICATIONS MAY BE OBTAINED, IN MOST INSTANCES, FROM THE AGENCIES ISSUING THEM.

Advance Report on the Fisheries of Nova Scotia, 1947, 12-1022, 13 p., processed, 10 cents. Fisheries and Animal Products Statistics, Dominion Bureau of Statistics, Canadian Department of Trade and Commerce, Ottawa, Canada, 1949. This booklet (mostly statistical tables) covers the fisheries of the Province of Nova Scotia and gives the production of fish and shellfish, the landed and marketed values, capital equipment of the fisheries, and the employees in the fisheries.

Doing Business with Occupied Japan, International Reference Service, vol. V, no. 112, December 1948, 10 p., printed, 10 cents. Office of International Trade, Department of Commerce, Washington, D. C. (For sale also by Superintendent of Documents, Washington, D. C., or from any Department of Commerce field office.) Lists the commodities available for export from Japan (includes fishery products), and gives information on business travel to Japan, business communications, agents, how to obtain lists of Japanese firms, making sales to and purchases from Japan, buyer-supplier sales contracts, payments and claims, and how to obtain data on tariffs.

"Fish," Chapter 13, A Basic Course in Meat Merchandising, p. 88-94. Super Market Merchandising, New York 19, N. Y., \$1.00 per copy. This chapter gives fundamental information covering the important phases of fish department operation in the super market which will be of value to any fish retailer. Covers the refrigeration, inspection, care and handling, sanitation, and display of fish and shellfish as well as the proper use of ice, and the cleaning and dressing of fish. In addition, a listing of the most popular fish and shellfish with a short description of its point of origin, market size, and usual market forms is included.

Forty-First Annual Report of the South Carolina State Board of Fisheries, (Year Ending June 30, 1947), to the Governor and General Assembly, 1947, 35 p., printed. South Carolina State Board of Fisheries, Charleston, S. C. Briefly covers only certain phases of South Carolina's fisheries and consists mainly of recommendations to the Legislature. Includes a brief report on oysters, cultivation and leasing of oyster bottoms, shrimp, shad, menhaden, mussels, clams, sturgeon, crabs, pollution, terrapin, and fish.

Introduction to Trawling, by A. Hodson, 63 p., illus., printed, \$1.75. Published by the author, 80 Spring Bank, Grimsby, England, 1948. This book deals with all phases of the "French" or Vigneron-Dahl type trawl as used in the British fishing industry. This trawl, with its extended sweeping effect, is superseding the earlier type of otter trawl in Europe, according to the author. The cod end, belly, baitings, square, lower wings, top wings, and "floppa" sections of the trawl and the numerous trawl accessories and running gear are described and the functions of each explained. This is followed by an explanation of the procedure for working the otter trawl. A well-illustrated chapter on net-making and net-mending concludes the book.

Report of the Commission on Conservation of Natural Resources to the Governor of Maryland (In compliance with Senate Joint Resolution No. 3, Laws of Maryland, Extraordinary Session, 1948), 91 p., printed. State of Maryland, Baltimore, Md., December 1, 1948. In this Report, the Commission deals with Maryland's manageable resources of soils, forests, and waters of the State of Maryland. The Commission made the following surveys, which affect Maryland's fisheries resources: (1) administrative organization, with particular reference to the Board of Natural Resources and the Department of Tidewater Fisheries; (2) oyster depletion, with a view to formulating a program for increasing annual production; (3) law enforcement, in particular, the laws relating to tidewater fisheries. The reports of committees appointed by the Commission to study these problems are printed as

appendices to the Report. No study was made of problems relating to crabs and migratory fish. The Commission made recommendations regarding the Board of Natural Resources, the Commission of Tidewater Fisheries, the rehabilitation of the oyster industry, the implementation of the recommendations respecting crabs and migratory fish contained in the Chesapeake-Potomac Study Commission report dated January 7, 1948; and the Chesapeake Bay Oceanographical Survey.

The State of Maine's Best Seafood Recipes, 63 p., colored illustrations, printed, free. Maine Department of Sea and Shore Fisheries, Augusta, Maine, 1948. A selection of 115 recipes representative of "Down East" seafood cookery. All of the recipes have been tested and checked with consideration for the availability of their ingredients in the average seafood market.

A Study of Fish, by Chapman Pincher, 343 p., with drawings by the author, printed, \$4.00. Duell, Sloan & Pearce, Inc., New York 16, N. Y., 1948. This book, originally published in England, and only last year published in an American edition is, as the author states in his preface, not primarily intended for ichthyologists. It is written in simple, non-technical terms wherever this is possible, and so joins the small group of similar books which includes Brian Curtiss's The Life History of Fish and Leonard P. Schultz's The Ways of Fishes. There are important differences in these books, however, for where Curtiss answers many of those teasing questions of the sport fisherman and Schultz holds attention with the unusual and personal anecdote, Pincher does both of these and more. In effect, he presents a scholarly primer, generously and interestingly illustrated with some 300 of his own line drawings, that might well serve as a textbook, but is sufficiently entertaining for general consumption. A slight criticism, or perhaps not a criticism at all, is the quite British tone and slant which might leave some Americans not completely satisfied with regard to the peculiarities of our own pet species, and the un-American type of moderate humor.

The Brian Curtiss book referred to above, now ten years old, long has been a favorite of the reviewer for its refreshingly intelligent but offhand method of dispensing solid information on the subject of fishes; Pincher brings together new information, and perhaps of more value, to a broader reading public. The chapters deal with smell, taste, and touch, hearing, balance, vision, locomotion, food, digestion, hormones, nervous system, breeding, development and growth, migration, coloration, and pollution. The book ends with a list of fishes, with common and technical names and typical locations, this last probably a more useful tool to the general reader than Schultz's pretentious appendix on classification of fishes.

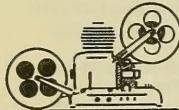
--P. E. Thompson.

United States Coast Pilot, Atlantic Coast, Section D, Cape Henry to Key West, Fifth (1948) Edition, Serial No. 715, 414 p., printed, \$1.50. Coast and Geodetic Survey, Department of Commerce, Washington 25, D. C., 1948. (For sale by the district offices and the Washington office of the Coast and Geodetic Survey.)

Utilization of Alaskan Salmon Cannery Waste, Part II, (FB85171-S2) 76 p., processed, 50 cents. Office of Technical Services, Department of Commerce, Washington, D. C., December 1948. The first part of the report on the utilization of Alaskan salmon cannery waste was published in December 1947. Part I gave the results of the preliminary industrial and economic surveys and discussed the studies on the use of the salmon cannery waste to prepare vitamin A oils and as a source of food for hatchery fish. The projects included in both the first and second reports were made possible by a research grant from the Industrial Research and Development Division of the Office of Technical Services to the Alaska Fisheries Experimental Commission. Experimental work was under the general supervision of the Pacific Coast and Alaska Investigations of the Branch of Commercial Fisheries, and investigations were carried out in Seattle, Wash., and Ketchikan, Alaska. Originally, a long-term research program was planned, but, because of the liquidation of the Industrial Research and Development Division, the projects had to be terminated within one year. The phases of the program discussed in Part II include the collection of raw materials in Alaska; utilization of salmon eggs for the production of cholesterol, protein and industrial fat; the addition of salmon head oil to

canned salmon; the vitamin content of fish waste products which were used for hatchery foods; and the processing of the cannery waste to obtain vitamin A oils.

Whale Meat Recipes, by Edith Adams, leaflet, 4 p., printed. The Vancouver Sun, Vancouver, B. C. This leaflet gives tested recipes for whale meat. Includes whale burgers, whale meat pie, fillet of whale with mushrooms, whale meat casserole, whale meat with onions, and curried whale meat.



FISHERY MOTION PICTURES



The following motion pictures are available only from the source given in each listing.

The Snapping Turtle, 16 mm. sound, black and white. Shows the life story of the reptile in its natural habitat. Photographic studies permit observations of snapping turtle's distinctive features, habits, and its encounters with other animal life. Available only from STATE GAME AND FISH COMMISSION, JACKSON, MISS. (No charge for the use of the film. Transportation costs to the borrower paid by the Commission, and return transportation to be paid by user.)

Sunfish, 16 mm. sound, black and white, 11 minutes. Reveals the sunfish constructing a nest, the laying of eggs, fertilization, hatching, and development of the young against predatory hazards. Biological relationships are also portrayed. No charge for the use of the film. Available only from STATE GAME AND FISH COMMISSION, JACKSON, MISS. (Transportation costs to the borrower paid by the Commission, and return transportation to be paid by user.)

The Production and Processing of Oysters, 16 mm. sound, black and white, 20 minutes. (Film strip also available.) Accompanied by an illustrated film guide. A film of general and technical interest showing the oyster in the growing areas and following it through all handling processes to the point of shipment to the consumer. The emphasis is upon the sanitary requirements of all procedures. Public Health Service, Federal Security Agency, Washington 25, D. C. NOTE: To borrow the films, communicate with your STATE OR LOCAL HEALTH DEPARTMENT. To buy the films, write the Surgeon General, Public Health Service, Washington 25, D. C., for purchase authorization form and a price.



Processing -- Miscellaneous Service Division

Illustrator--Gustaf T. Sundstrom

Compositors -- Jean Zalevsky and Norma D. Loeffel

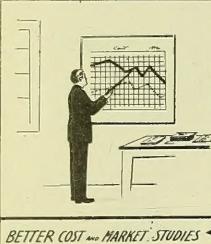
FISHERY MARKET NEWS

MAKES POSSIBLE—

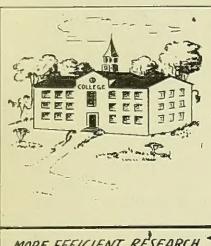
INCREASED INCOME



CURRENT SUPPLY and PRICE DATA



BETTER COST and MARKET STUDIES



MORE EFFICIENT RESEARCH

EFFECTIVE DISTRIBUTION



INCREASED CONSUMPTION



IMPROVED PURCHASING



SPEEDIER DELIVERY

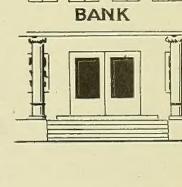


STABILIZED SUPPLIES

FASTER FLEET MOVEMENT



INCREASED FOREIGN TRADE

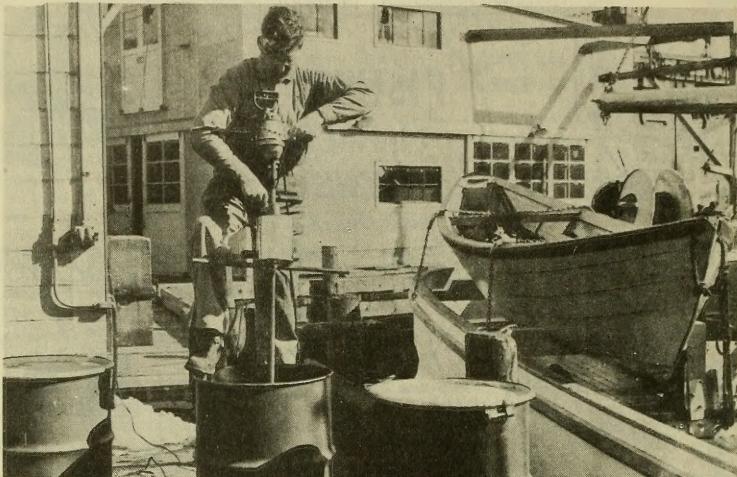


SAFER LOANS

U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
WASHINGTON, D. C.

THE FISH LIVER OIL INDUSTRY

Fishery Leaflet 233, "The Fish Liver Oil Industry," is designed to bring together into one publication the widely scattered information about this relatively young industry that has grown from a humble beginning to international economic importance in a short time. This report is devoted almost entirely to the vitamin A field. For many years, fish livers were the principal source of vitamins D, but due to the advent of synthetic vitamins D, the fish-liver source has become less important. However, there are in the context brief descriptions of the assay methods now used for the estimation of the vitamins D.



This 104-page illustrated publication classifies livers with respect to oil content and vitamin A potency, and gives the relationship of oil content and vitamin A potency to choice of extraction method. It covers processing methods; effect of state of livers on processing procedure; factors affecting the quality of the oil produced; factors for consideration in contemplated business venture; distribution of finished oil, vitamin-oil specifications, prices, etc.; vitamin D assay; future supplies of vitamin A; and foreign developments.

Copies of Fishery Leaflet 233 may be obtained upon request, without charge, from the U.S. Fish and Wildlife Service, Washington 25, D. C.

Form M-23 - 3/49 - 2,600

PERMIT NO. 1015

OFFICIAL BUSINESS

WASHINGON 25, D. C.

FISH AND WILD LIFE SERVICE

DEPARTMENT OF THE INTERIOR

UNITED STATES